NAVY CIVIL Engineer

WINTER 1988-89

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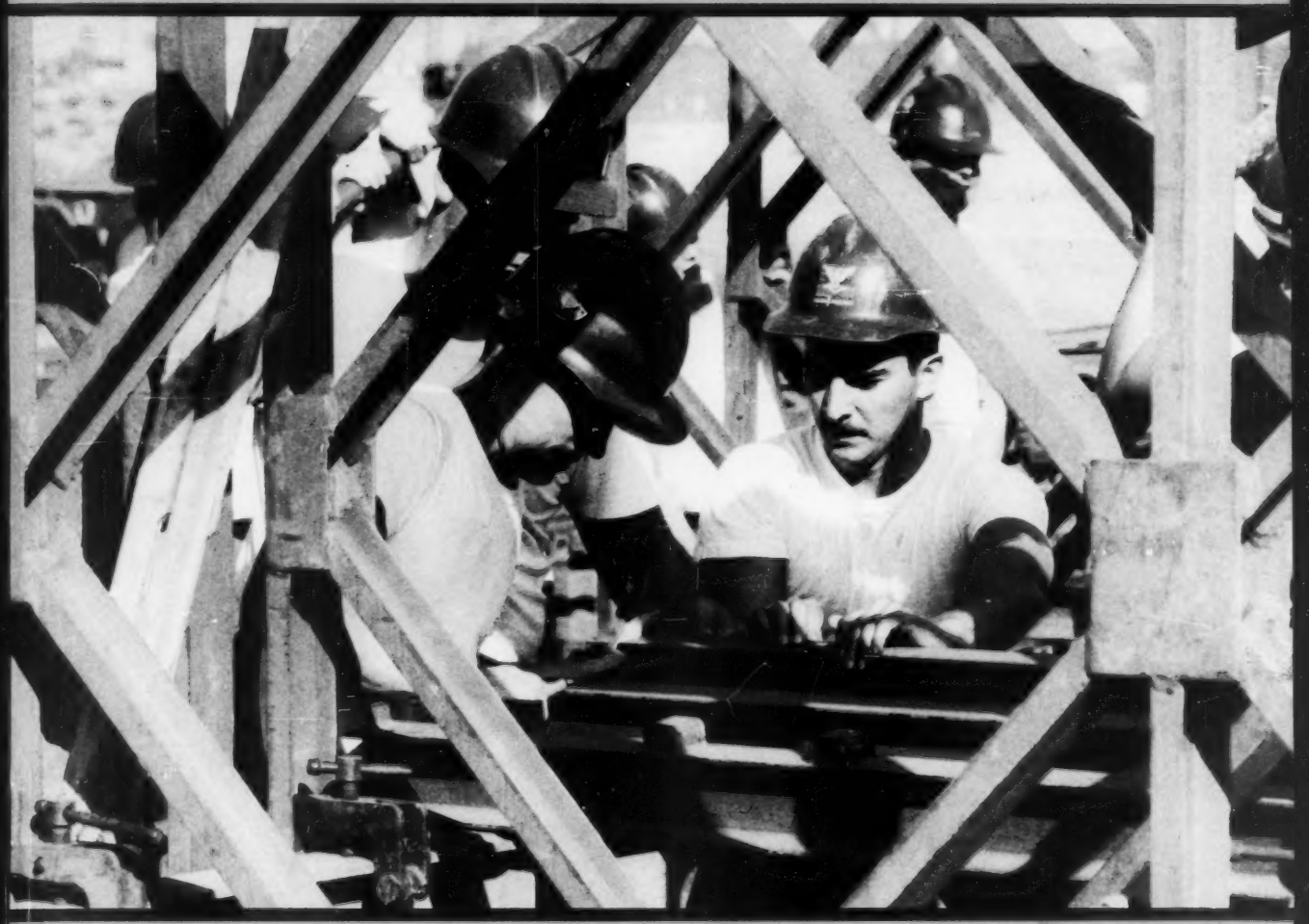

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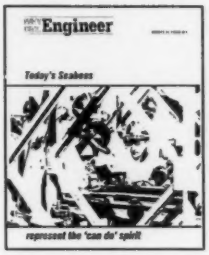

NMCB-4 Seabees setting a racker in place on a Bailey bridge are the subject of this issue's cover. Photo credit goes to PH3 M. C. Thursten, USN.

NAVY CIVIL Engineer

WINTER 1988-89 Vol. XXVIII, No. 3

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Summer 1989	Environment	April 15, 1989	July 1-15, 1989
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Spring 1990	Management	Jan. 15, 1990	April 1-15, 1990

Naval Air Development Center develops new approach to energy conservation:

ENERGY MANAGEMENT MODELING

By LCDR EARL L. SMITH, JR., CEC, USN
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THE ENERGY MANAGEMENT APPROACH to energy conservation has become a vital engineering task in recent decades. Until the early 1970s, energy sources seemed to be both inexhaustible and expendable. These assumptions were seemingly verified by the relatively low cost of most energy sources. Since then, the cost of fuel and all energy sources has increased dramatically.

At the Public Works Department of the Naval Air Development Center (NADC) we have responsibility to continue seeking economy and efficiency in all facility management and operation activities. With our ever-increasing annual energy bill, we are continuing our efforts to improve our energy efficiency. With wise management techniques and methodology, we can be successful in winning the energy battle in the years to come as in the past decades.

Our experience shows that the key to a good energy management approach is dedicated involvement at all levels within the chain of command and dependence on contributions made by the various engineering departments of our Center. NADC established lines of communication for energy management which are shown in Figure 1.

For the purpose of more efficiently conserving energy usage at NADC, the Facilities Management Division has developed Energy Management Modeling (see Figure 2). Energy Management Modeling (EMM) shows new ways of thinking objectively in terms of three dimensions for an energy conservation program. EMM is a novel approach for a broad engineering task to accomplish a reduction in energy usage within capital limits required and providing effective technical energy solutions to all areas of energy management at NADC.

The modeling includes identification of inter-relationships between different functions of the Public Works Department and various engineering departments involved in the energy conservation program, steps for reviewing the energy management program, identification of feasible energy conservation opportunities and option, as well as their implementation. Improving the process of efficient energy usage is the goal of the Energy Management Modeling. This modeling technique has many other benefits.

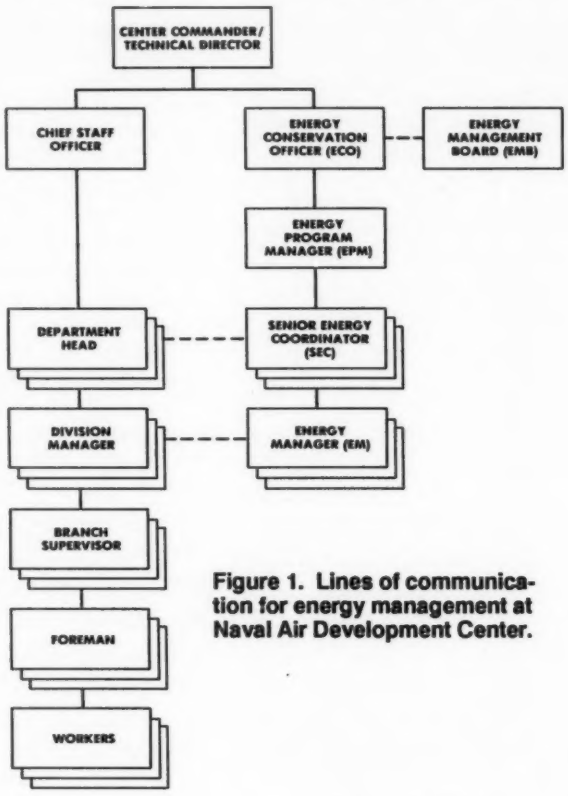


Figure 1. Lines of communication for energy management at Naval Air Development Center.

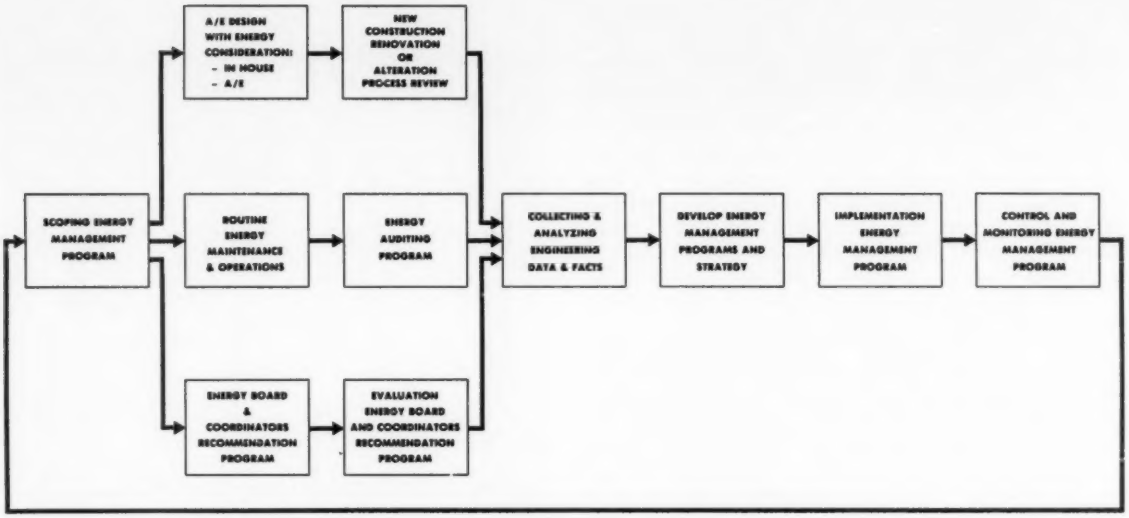

A/E DESIGN WITH ENERGY CONSIDERATION: - IN HOUSE - A/E
NEW CONSTRUCTION RENOVATION OR ALTERATION PROCESS REVIEW
SCOPING ENERGY MANAGEMENT PROGRAM
ROUTINE ENERGY MAINTENANCE & OPERATIONS
ENERGY AUDITING PROGRAM
COLLECTING & ANALYZING ENGINEERING DATA & FACTS
DEVELOP ENERGY MANAGEMENT PROGRAMS AND STRATEGY
IMPLEMENTATION ENERGY MANAGEMENT PROGRAM
CONTROL AND MONITORING ENERGY MANAGEMENT PROGRAM
ENERGY BOARD & COORDINATORS RECOMMENDATION PROGRAM
EVALUATION ENERGY BOARD AND COORDINATORS RECOMMENDATION PROGRAM

Figure 2. Energy Management Modeling.

REVIEWING ENERGY MANAGEMENT PROGRAM

The first step in this model is reviewing the Energy Management program for short- and long-term planning. Short-term facilities planning consists of and a two-year plan, and requires small capital investment. Long-term facilities planning consists of a five-year plan, which is more technically complex and requires more capital investment and time.

The Naval Air Development Center consists of various buildings and facilities covering a total of 1.4 million square feet. All structures and facilities were constructed in the early 1940s to build aircraft for World War II. Only two buildings--the TACAMO lab and the fire station (which comprise only 3 percent of NADC's total square footage) were constructed recently. The nature of NADC's current mission results in a need for construction of facilities, renovation, and alteration or modification of existing facilities to accept new or expanding project efforts. In addition, existing facilities constantly require repairs due to age. Some of the existing building components have deteriorated to such a degree that replacement or repair is essential.

After identifying requirements for a new facility or renovation, alteration, or modification of existing facility, the Public Works Department pinpoints energy waste in various systems. During this phase, we consider the action required for identification of energy waste in various systems and components and make recommendations to increase energy efficiency.

The review can be broken down into the nine systems and components, shown in Figure 3.

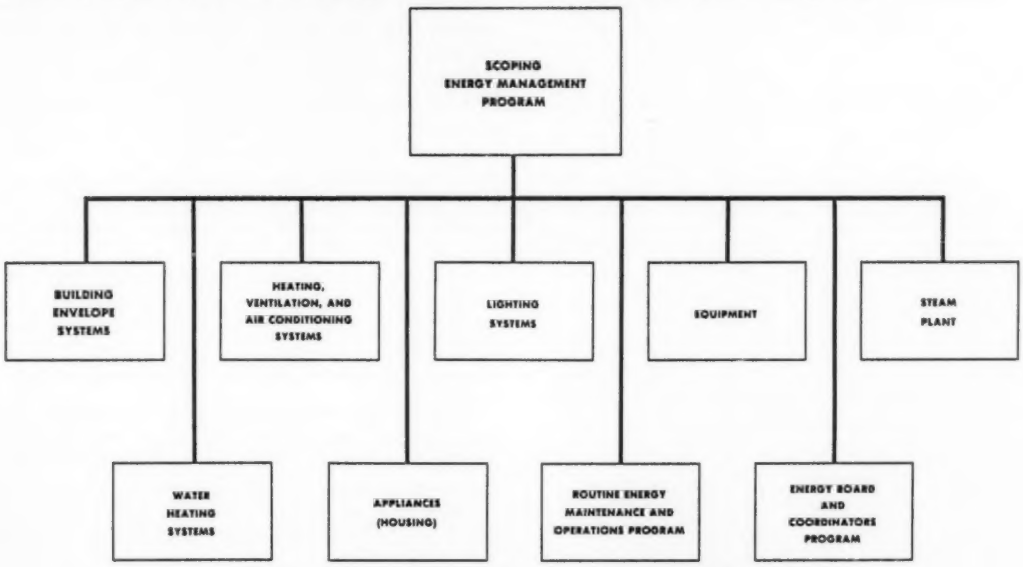


Figure 3. Reviewing an energy management program.

BUILDING ENVELOPE SYSTEMS

Building envelope systems, one of the largest systems in Energy Management Modeling, includes external surfaces like walls, windows, roof, floor, etc. which are subject to climatic impact. To minimize various types of energy waste from building envelope systems, the Public Works Department (PWD) has implemented short-term planning and long-term planning programs. Short-term planning requires a relatively small capital investment and can be done in minimum time.

Energy conservation implementation for building envelope systems is provided in Figure 4. For example, NADC has several large outside hangars and loading doors, which are required for constantly moving vehicles, materials, equipment, and people in and out of the buildings. When these doors are open, a large amount of heated or cooled air escapes or enters the building, resulting in a considerable energy waste during cooling and heating seasons. To minimize this type of energy waste we implemented:

1. Installation of a curtain of plastic strips around openings.

2. Installation of flexible moldings and weatherstripping along the bottom of openings.

In addition, short-term planning program includes:

1. Installation of reflective coating on roofs of various buildings to enhance the energy efficiency of the buildings.

2. Installation of reflecting shades, curtain, or drapes in all offices and especially in the military family housing.

3. Installation of insulated metal panels placed over some windows in Buildings 1 and 2. The functions have changed and the need for natural lighting has greatly diminished. Therefore, insulated panels were added to cut energy losses through the windows.

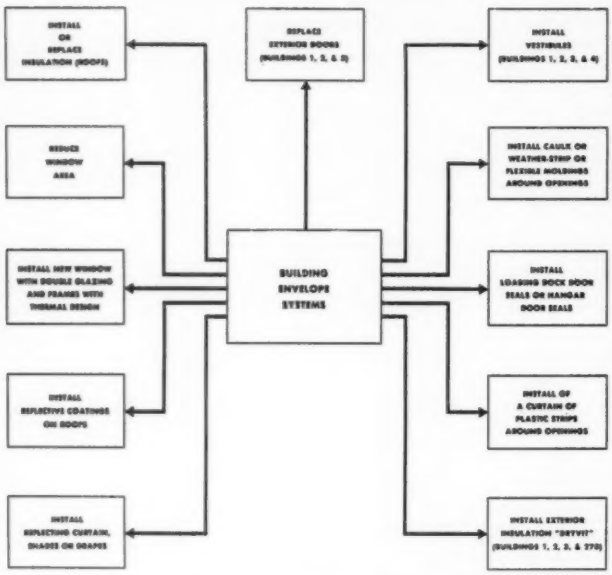


Figure 4. Implementation of energy conservation for building envelope systems.

Replacement of large overhead hangar door with installation of new roll-up door for vehicle access and standard door for personnel in Building 2.

The PWD developed a roof repair program for all roof areas around NADC. The program involves the replacement of all roof membranes, the removal of roof structures which give rise to roof leaks, and the repair of roof system items such as insulation, drain, and flushing. We have established a "tiger team," whose primary mission is to find the possible source of the leaks and implement corrective action.

The PWD has also effectively implemented a long-term program for the various projects, which is more technically complex and requires more capital investment and time. Long-term planning includes architect-engineer (A-E) design (offices, computer rooms, labs, replacement hangar doors, etc.) with energy considerations in the construction projects. The Engineering Division of PWD ensures that design criteria for the NADC construction projects reflect an optimum solution for energy conservation measures from the systems level standpoint. The Engineering Division evaluates the outside A-E design documentation to ensure that the facility requirements meet or exceed energy conservation factors for the building envelope systems, heating, ventilation, and air conditioning (HVAC) systems, lighting systems, equipment, steam plan, and water heating systems.

After analysis and evaluation of energy waste in the various areas of the building envelope systems where there is high infiltration of outside air through the hangar doors, the Public Works Department recommended and implemented for long-term planning the following projects:

1. Replacement of hangar doors in Buildings 1 and 2. The large overhead doors in Building 1 were replaced by smaller doors and the remainder of the wall area was replaced by a structural wall with insulation. In Building 2, the two canopy doors were removed and replaced with a fully insulated structural wall and new door for people. Vehicle access to the storage area is now available through a new roll-up type door, which has saved 573 MBTU per year.

2. Cutting a small, person-sized door in the overhead door.

3. Adding insulation to the walls, roofs, or ceilings and floors of existing buildings to bring the ceiling "U" factor into conformance with requirements for alteration before air conditioning is added. This installation reduces heat gains and losses between the inside and outside of buildings.

4. Retrofit Building 70, which included installation of new window with double glazing and installation of "Dryvit" system.

5. We also recommended and implemented the construction of seven vestibules, in Buildings 1 and 2 where there is very high infiltration of outside air through the doors. A vestibule is a small room with two sets of doors, one set opening to the building exterior and another to the building interior. When the exterior door is opened, only a small quantity of warm air from the vestibule can escape while cold air may only penetrate as far as the interior door. When the interior door is opened, only the small quantity of cold air already in the vestibule can enter the building. After construction of these vestibules, a considerable amount of energy waste during cooling and heating seasons was minimized.

LIGHTING SYSTEMS

Another important system in the Energy Management Modeling is lighting. Twenty percent of all electricity generated in the United States today is used for lighting businesses and homes. Energy conservation in lighting systems can be achieved with little effort and does not require a change in lifestyle or a substantial investment of capital funds. Analysis of lighting systems in various buildings and facilities at NADC shows that they were designed using a uniform layout of luminaries to provide a general level of illumination in a space, which is not efficient. During preparation documentation for renovations and alterations of various offices, the Public Works Department examines and evaluates many aspects of existing interior and exterior lighting systems and determines what can be done to improve the lighting level by introducing a new, more efficient lighting system and still save energy and money. We have broken down all energy conservation opportunities and options into ten components (see Figure 5). Each of these components has already been implemented or is being implemented.

The PWD ensures that design criteria for overhead lighting during working hours will be 50 foot-candles at work/task station and 30 foot-candles in other administrative office or work areas. In halls, warehouses, and nonwork areas, lighting level standard is 20 foot-candles. In cafeterias, 25 foot-candles lighting level standard was applied with due consideration to related factors of glare and contrast in some instances; in various cases redesign of alterations or supplementary lighting may be necessary to avoid eyestrain and maintain personnel efficiency. During nonworking hours, lighting should always be reduced to the minimum level consistent with safety and security considerations.

The PWD is constantly removing old lamps or fixtures and replacing them with new types that have lower power requirements. We also replace centerwide 40-watt tubes with 35-watt tubes. In addition, the Public Works Department recommends the use of higher reflective paint colors and surfaces in the offices, corridors, etc. In some cases, we install more efficient lenses and ballasts. When offices have one common light switch, we install separate switches for each room, which helps save considerable energy.

During design stage for renovation of large and open or small and enclosed interior spaces at NADC, we recommend and implement various SPA and SPI lighting systems, which provide diffused and glare-free lighting. One SPA series is manufactured by Halo Lighting Division, McGraw-Edison Company. A unique ballast and simple fixture support system makes installation and maintenance of this lighting on any accessible ceiling easy. The SPA series consists of a two-legged fixture with a shallow ballast compartment that allows it to fit under a desk. The difference between two identical, high-pressure sodium (HPS) SPA 1 and SPA 4 fixtures is only the height. The height of SPA 1 is 72 inches and SPA 4 is 62 inches. Both series use the same four-lamp wattage--100, 150, 175, and 250--which provide high light output while using less energy than conventional downlighting.

Comparative economic analysis of SPA or SPI lighting systems and conventional overhead fluorescent lighting systems shows a 12 percent reduction in total cost of lighting. For all doorway lighting, NADC effectively used wall-mounted NRG-200 series HPS "Styleliter" manufactured by Hubber Lighting Company. Wall-mounted lights are easy to install with wall-mounting plate over recessed outlet box with lag bolts and give approximately 80 percent energy savings with one-year payback. For building perimeter outdoor security lighting and doorway lighting, NADC effectively uses high-pressure sodium lamps with wall projection cutoff optics manufactured by Ruud Lighting Company. The wall-mounted fixture with various range of

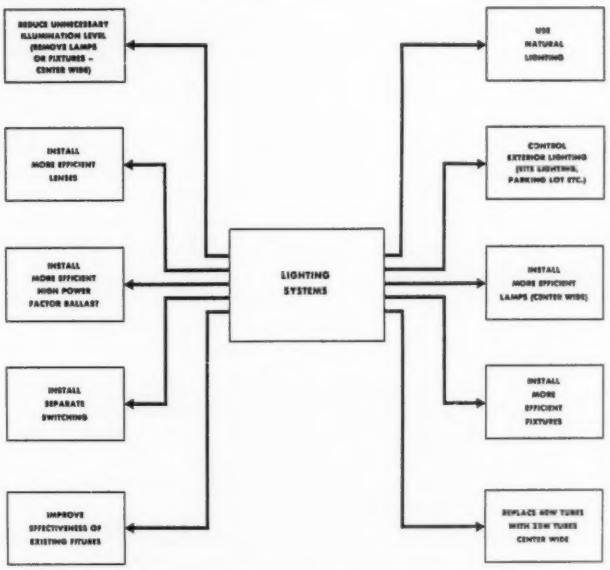

REDUCE UNNECESSARY ILLUMINATION LEVEL (REMOVE LAMPS OR FIXTURES - CENTER WIDE)
INSTALL MORE EFFICIENT LENSES
INSTALL MORE EFFICIENT HIGH POWER FACTOR BALLAST
INSTALL SEPARATE SWITCHING
IMPROVE EFFECTIVENESS OF EXISTING FIXTURES
LIGHTING SYSTEMS
USE NATURAL LIGHTING
CONTROL EXTERIOR LIGHTING (SITE LIGHTING, PARKING LOT ETC.)
INSTALL MORE EFFICIENT LAMPS (CENTER WIDE)
INSTALL MORE EFFICIENT FIXTURES
REPLACE 40W TUBES WITH 35W TUBES CENTER WIDE

Figure 5. Implementation of energy conservation for lighting systems

lamp wattage of 35, 50, or 70 watts provides sharp cutoff forward projection of light away from the wall.

Since NADC is largely an indoor activity and has numerous hallways, corridors, vestibules, and corridor connections between buildings, and illumination levels in hallways are second in importance to visual acuity, serious consideration by the Public Works Department is given to replacement of all incandescent and fluorescent fixtures in these areas, with high-pressure sodium fixtures in an indirect floodlight mode of operation. These lamps have a golden-yellow light spectrum, which correlates perfectly with the human eye's vision spectrum, giving excellent contrast and visibility at low light levels. Although the color rendition may be imperfect, this cannot be considered an important factor in hallways. Light output of these lamps is about 300 percent higher than fluorescent lamps, allowing for at least 50 percent savings in electric consumption. In addition, unnecessary area lighting was reduced in all corridors where the general lighting level is very high by removing or disconnecting fixtures which were nonessential.

Serious consideration by the PWD was given for night lights and emergency lighting at NADC. We installed 50-watt, recessed high-pressure sodium downlights manufactured by Halo, McGraw-Edison Company, which have a glare-free, low-brightness downlight and effective and economically distribute even illumination. This particular lighting provides substantial savings with low installation cost, high efficiency, and long life.

After analysis of various types of lights for walkways and roadways, the Public Works Department selected and installed the MAGNAFORM II RC series high-pressure sodium lamps with 100, 150, or 250 watts (manufactured by Hubbel Lighting Division), which provide efficient lighting and easy maintenance. Controlled lighting is produced by a horizontal burning lamp, an anodized reflector system with mounting heights of 20 to 30 feet.

The PWD effectively implemented photocell controls which are used for outdoor purposes. They activate and deactivate lighting based on the amount of ambient light detected.

STEAM PLANT

Conservation energy for planning and implementing the maintenance and operation program of the existing steam plant is an important part of Energy Management Modeling (see Figure 6).

The Public Works Department has made operational changes to reduce energy waste in existing steam plant. A few examples of these efforts are as follows:

- Boiler controls are tuned up and adjusted to optimize boiler combustion over the entire range of boiler operation. The adjustment enables the boilers to be operated with significantly reduced level of excess combustion air, thereby saving a substantial amount of energy and improving the overall efficiency of the boiler.
- Implementation of boiler plant energy conservation measures such as blowdown heat recovery, back-pressure turbines, and preheating of combustion air for Boiler No. 3.
- Insulation steam and condensate lines.

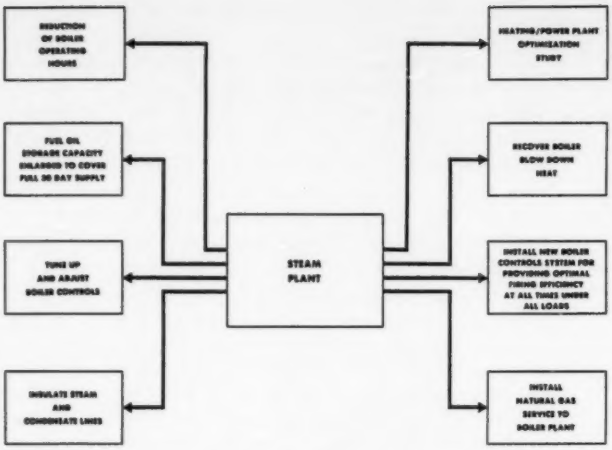

REDUCTION OF BOILER OPERATING HOURS
FUEL OIL STORAGE CAPACITY ENLARGED TO COVER FULL 30 DAY SUPPLY
TUNE UP AND ADJUST BOILER CONTROLS
INSULATE STEAM AND CONDENSATE LINES
STEAM PLANT
HEATING/POWER PLANT OPTIMIZATION STUDY
RECOVER BOILER BLOW DOWN HEAT
INSTALL NEW BOILER CONTROLS SYSTEM FOR PROVIDING OPTIMAL FIRING EFFICIENCY AT ALL TIMES UNDER ALL LOADS
INSTALL NATURAL GAS SERVICE TO BOILER PLANT

Figure 6. Implementation of energy conservation for steam plant.

- Shutdown of the boilers every night and on weekends whenever the outside temperature is above 32 degrees F.
- Shutdown of various sections of the steam distribution system during summer months.
- Reducing the domestic hot water supply temperature. (Booster heaters were added to the cafeteria and photo lab to raise the reduced supply temperature to meet individual requirements of these areas.)

HVAC SYSTEMS

One of the important and largest systems in the Energy Management Modeling is heating, ventilation, and air conditioning (HVAC). During the preparation of HVAC design, the PWD evaluated for implementation the various systems with low energy use. Energy conservation implementation at NADC for HVAC systems is represented in Figure 7.

Many design features have been implemented in the HVAC system recently during renovation or alteration of HVAC in Building 70, TACAMO lab, etc. At NADC, we are using variable or adjustable frequency controller or speed drive. This makes possible a wide speed-control range without causing low speed while also reducing maintenance cost and increasing energy savings and productivity. Our experience shows that for many fan installations operating at reduced speed, when there is a reduction in air demand a substantial amount of energy is saved while maintaining high efficiency at a low power level.

During renovation of HVAC in Building 70, the PWD implemented a variable air volume (VAV) system. This HVAC system will begin functioning by the end of 1988. Projected savings are 15 to 40 percent in energy consumption for this building.

In addition, the VAV system will eliminate or minimize reheating and reduce supply and return air quantities. Design criteria for new energy management at NADC for heating of all the administrative spaces is 68 degrees F. during working hours; 55 degrees during nonworking hours; and in the hangar, warehouse, and shops 55 degrees F.

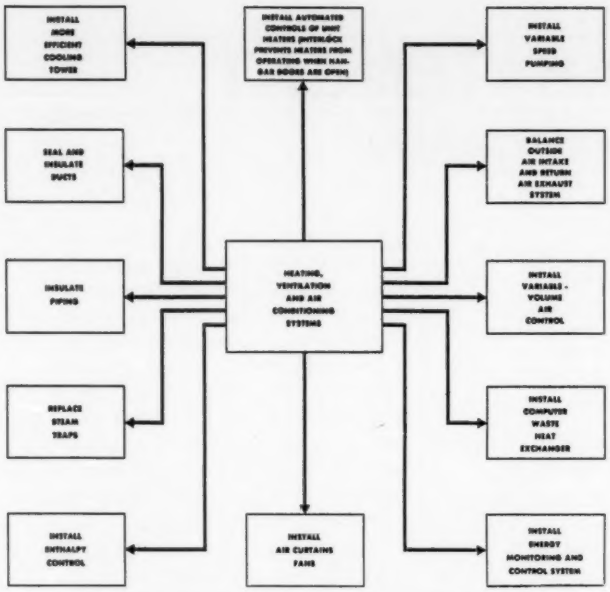
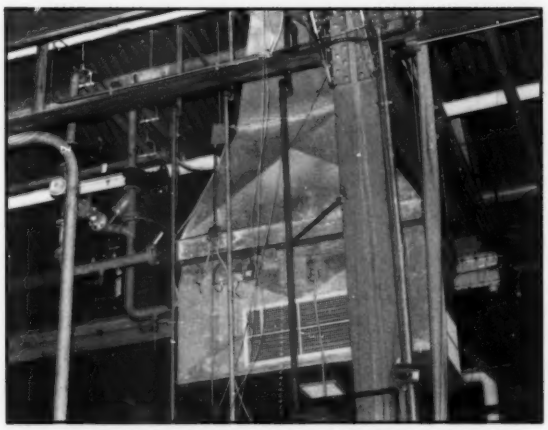

INSTALL MORE EFFICIENT COOLING TOWER
INSTALL AUTOMATED CONTROLS OF UNIT HEATERS (INTERLOCK PREVENTS HEATERS FROM OPERATING WHEN HANGAR DOORS ARE OPEN)
INSTALL VARIABLE SPEED PUMPING
SEAL AND INSULATE DUCTS
BALANCE OUTSIDE AIR INTAKE AND RETURN AIR EXHAUST SYSTEM
INSULATE PIPING
HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS
INSTALL VARIABLE-VOLUME AIR CONTROL
REPLACE STEAM TRAPS
INSTALL COMPUTER WASTE HEAT EXCHANGER
INSTALL ENTHALPY CONTROL
INSTALL AIR CURTAINS FANS
INSTALL ENERGY MONITORING AND CONTROL SYSTEM

Figure 7. Implementation of energy conservation for HVAC systems.

during working hours.

In order to reduce the consumption of electricity in Building 2, NADC installed a Strainercycle Free Cooling system which is used as an alternative to running chillers during the winter. The system utilizes the evaporative capacity of the cooling tower to cool water to a sufficiently low temperature that it can be used to provide air conditioning without running the chiller. The system is designed to filter all particulates 125 microns and smaller out of the cooling tower water. Energy savings amount to $58K annually.

The PWD effectively implemented installation of several air curtain units, which provide a forced flow of air across an open doorway. The invisible curtain of air acts as a separating air lever between cold and warm air. After review and analysis of waste heat in the computer area, the PWD recommended and effectively implemented installation of a Computer Waste Heat Exchanger. We have substantial energy savings from reutilizing the heat generated as a by-product of normal computer use.



Installation of energy saver--computer waste heat exchanger.

For effective monitoring and control of energy management functions like damper control, reheat coil reset, chilled water temperature reset, outside air temperature reset, etc., NADC is using the Energy Monitoring and Control System (EMCS), manufactured by Honeywell, Inc. EMCS consists of three generations of the "Delta" automation building management equipment: older generation of the Delta 2000--remote data-gathering panels (DGPs); Delta 1000; and a third generation of Honeywell automation--"EXCEL" (Direct Digital Control (DDC)).

Steam Trap System

One of the important elements for efficient utility operations and energy conservation in HVAC systems is the steam trap system. Good condition of the steam trap can save significant energy; neglected steam traps can waste a lot of energy and money.

The PWD analyzed the complex problem with steam traps in various industrial facility plants and decided that the best approach for an effective steam trap system is to have a thorough survey and evaluation of all 5,200 steam traps at NADC.

Based on the steam trap inspection result, the PWD initiated a permanent preventive maintenance program for all steam traps. The PWD effectively started replacing steam traps according to standard scheme.

Our experience indicates that establishing standards for trap installation for all facility plants minimize the risk of misapplication and confusion for maintenance technicians and reduce time and cost of installation of traps. Technicians are doing a better quality job because they are dealing only with one type of steam trap.

As a result of implementing the preventive maintenance program, the distribution system at NADC is very well-maintained, and estimates show only 5 percent of the steam traps on the interior system to be defective, and the steam traps on the exterior distribution system were not leaking.

SUCCESS WITH ENERGY MANAGEMENT MODELING

Our experience shows that employee involvement at all levels at the Naval Air Development Center through energy coordinations, publications, and beneficial suggestions is a very important part of energy management and modeling. Numerous beneficial suggestions are submitted each year concerning energy conservation. Advising Center employees of the Energy Conservation Program has been accomplished through articles in the Center's newspaper, the *Reflector*, notices in the *Log*, Energy Awareness Week, and energy status boards at the credit union.

THE ENERGY MANAGEMENT MODEL we've presented can serve as a useful guide for those analyzing feasible energy conservation opportunities and options in facilities and buildings. The model is a useful planning tool for identifying energy problems and providing effective technical energy solutions and approaches. Its implementation will provide methods for reducing operational budgets by saving energy costs and time. □

ASBESTOS ABATEMENT

What are your responsibilities?

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As an industrial hygienist I have dealt directly with engineers supervising asbestos abatement operations and contractors hired by the government to perform the work. In most cases the abatement supervisor, usually a civil engineer, relies on the contractor to know the extent of the work that needs to be done and to do the work in accordance with the contract.

Problems arise when the contractor sees an opportunity for great profit when he or she can get contract changes. One of the most profitable contract changes would be to require an asbestos abatement prior to performing the contracted work. Examples are easy to find. Contractors are demanding asbestos abatement prior to almost any job requiring work in an old building.

Determining Need for Abatement

From these problems have evolved some interesting questions. For example, what constitutes an asbestos abatement operation? In answering this, we must allow some latitude for judgment because the contractors want to call any work with asbestos an abatement operation. To keep costs under control we must limit the definition and remain conservative because of safety and health concerns.

When we define an abatement operation we must assume a problem exists with the asbestos and we abate or correct the problem. If we are asking a worker to paint over asbestos-containing wallboard, we would be engaged in an abatement operation only if that wallboard had been producing dust or if the painting would cause dust to be produced. If no problem existed and the work we want done would not produce a dust problem the work would not be an abatement operation.

Only licensed contractors can perform asbestos abatement operations, and they are very expensive. A $20,000 remodeling job can become a $600,000 asbestos abatement operation.

Other questions to ask are: Once an abatement operation has started, what are the rules? And when the job is done, how is it determined that the people are adequately protected and the cleanup is complete? The Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) both have regulations governing these operations--which rules take precedence?

EPA and OSHA Requirements

The new OSHA law and EPA guidelines are often misunderstood and confused as being interchangeable. This has resulted in a cost to the government of hundreds of thousands of dollars.

The new OSHA law and EPA guidelines are often misunderstood and confused as being interchangeable.

There are differences between the most commonly misinterpreted requirements of each. First, the OSHA law, 29 CFR 1910.1001, Subpart Z, lists the permissive exposure limit (PEL) as .2 fibers per cubic centimeter (f/cc) and the action level as .1 f/cc. The employer is only required to take actions when the exposure is above the action level. If asbestos workers are exposed to less than .1 f/cc they can work completely unprotected. If their exposure is between the action level and the PEL the employer must institute a training program, medical surveillance, and personal sampling of each class of worker. If employee exposure is above the PEL a written program must be implemented that will reduce employee exposure below the PEL. This program must include engineering controls, work practices, posting of regulated areas, and establishment of a respiratory protection program.

The personal monitoring required by OSHA for exposures above the action level has created some confusion because the EPA also has sampling requirements. Both EPA and OSHA reference the NIOSH 7400 method when discussing how samples are to be collected and analyzed. OSHA lists the analysis portion of the 7400 method as "nonmandatory" but a sample collection method as mandatory. This is identical to the 7400 method with one limitation: limiting the sample flow rate to 1.5 to 2 liters per minute (lpm). The 7400 method allows flow rates up to 16 liters per minute.

EPA lists all of their procedures as "recommended practice." It doesn't matter whether it is nonmandatory or recommended practice because both EPA and OSHA state that you must do it their recommended way or "an equivalent" method, and there is no equivalent method. Another consideration is that if you use the recommended practice you can easily defend yourself in court; if you come up with something else you may have difficulty defending it as "equivalent."

EPA requires that after an "abatement" operation the area must be cleaned to a "no dust" condition and that "no asbestos-containing material remains." These conditions are difficult to achieve and make the job of an inspector very tough. A porous material such as concrete would have small amounts of material embedded in impossible-to-reach places. To aid the

inspector in ensuring that every reasonable effort has been made to comply with both criteria, EPA has developed a two-part inspection. The inspection consists of a visual inspection and air sampling.

Visual inspection. The visual inspection ensures job completeness, that is that all the asbestos has been removed. The inspector must pay special attention to "pipes, beams, and irregular surfaces that may have corners and hard-to-reach areas." If the asbestos has been encapsulated check that the right amount of material was used to ensure coverage, "there are no holes, voids, or cracks." The normal procedure used in California is to remove all the asbestos that is practically possible to remove, leaving only what remains in the pores of the base material, and then spray on a light coat of sealant (airless sprayer must be used). When a contractor follows this procedure they are assured to have taken all reasonable actions to achieve the "no dust" requirement and that all asbestos has been removed or "sealed in."

Air testing. The air testing should be done only after the site has passed the visual inspection. The air testing consists of taking a minimum of 5 air samples, 3,000 liters collection for each sample, using the 7400 method for sample collection criteria. These samples are analyzed using the 7400 method sample analysis procedures to determine compliance with the EPA standard of .01 f/cc "no dust" (10 times tougher than OSHA). The sample procedure is to blow all dust into the air with leaf blowers and then maintain suspension by using fans while collecting the samples. All 5 samples should be taken at the same time using 5 high-volume pumps. If one of the 5 samples is over the .01 f/cc criteria, the site must be recleaned and retested.

One must remember that the OSHA action level of .1 f/cc is based on an exposure of only 8 hours per day, whereas the EPA standard of .01 f/cc is based on a possible 24-hour-per-day exposure.

This poses another interesting question: Does an industrial plant have to be cleaned to the OSHA standard or the much tougher EPA standard? The answer is that it depends on the operation but eventually it must be cleaned to the EPA standard. If the operation is an asbestos operation the employer must attempt to stay below the OSHA PEL, based on the OSHA monitoring procedures. When the operation is closed the building must be cleaned to EPA standards and tested using EPA procedures. This must be done before the building can be used for another operation. In addition, an area must be tested to the EPA standards after any asbestos removal or abatement operation.

When the abatement operation is completed the contractor will supply "clearing air samples." Many times these samples will be of less than 3,000 liters; some analyzed to the OSHA action level of .1 f/cc, some analyzed to the EPA standard of .01 f/cc. These samples are of no value since they are not personal samples, making them invalid for OSHA and they are not 3,000 liters, making them invalid for EPA.

Summary

When you require work to be done on buildings containing asbestos be sure that you, not the contractor, determine if asbestos abatement is needed. Just because asbestos is present does not mean an abatement operation needs to be done. If an abatement operation is completed be sure the contractor follows all the rules and gets help from an industrial hygienist when interpreting the sampling results.

References

For more information, check these references: OSHA 29 CFR, Part 1910.1000, Subpart Z; EPA 40 CFR Part 61, Subpart M; EPA 560/5-85-024, purple book; EPA 600/4-85-049, silver book; EPA 560/5-85-030a, pink book. Most states have additional laws covering asbestos abatement. □

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The ideal public works organization

By CDR JOHN F. CONROY, CEC, USN
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Public Works Officer
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Public works is a big part of our business. It takes up most of our billets. It spends most of the money we manage. Yet we don't have any real consistency in our organizational approach to it. Each public works department (PWD) has little nuances which make it different from others. So, in searching for that consistency, I have formulated what I have termed the "ideal public works organization." I use the word "ideal" primarily to stir some emotions. I am not sure there is an ideal public works organization that fits all naval activities, but I hope it will stimulate some debate on the subject.

I base my organization on my experiences and observations as a three-time public works officer (PWO), twice with in-house shops and once with a base operating services (BOS) contract, and a tour as executive officer of a public works center.

Figure 1 shows my concept of an ideal PWD organization. As you can see, it is a hybrid outfit, with some in-house shops capability and some contracting. Having managed a PWD with all maintenance, utilities, and transportation under a BOS contract, I can attest to that BOS contracts work. Our contractor at Naval Air Station (NAS) Memphis performed in an overall satisfactory manner, performing exceptionally well in some areas and also having some weaknesses, much like an in-house organization. The bottom line, however, is that we cannot say BOS contracts don't work or that we can't contract for public works services. It has been proven that we can.

Some functions are better suited for contracting than others. When contracting for a service, some degree of control and response is given up and some continuity and corporate memory is sacrificed. In return, you are relieved of the personnel problems associated with an in-house work force and most of the associated overhead, there is generally a lower labor rate. This loss of control and response is obviously more acceptable for some functions than others, as is the loss of continuity and corporate memory. Those areas where it is more acceptable are those better suited to contracting. These are listed in Figure 2.

Conversely, those I have recommended for retention in house are those which are absolutely vital to the mission. In these areas, there must be instant response, absolute control (i.e., drop everything else and get it fixed), and a sound knowledge of the systems (continuity and corporate memory). Additionally, I have found it difficult to obtain good contractor performance in such areas as economic operation of a boiler plant and maintenance of the plant and underground distribution systems.

I believe this combination of selecting what to contract and what to retain in house gives the best mix of the economies generally associated with contract forces and the response, control, and continuity necessary for the most critical functions.

As for some of the other aspects of my organization which may look a little strange, let's start with the assistant public works officer (APWO) for management. I am purposely ignoring the

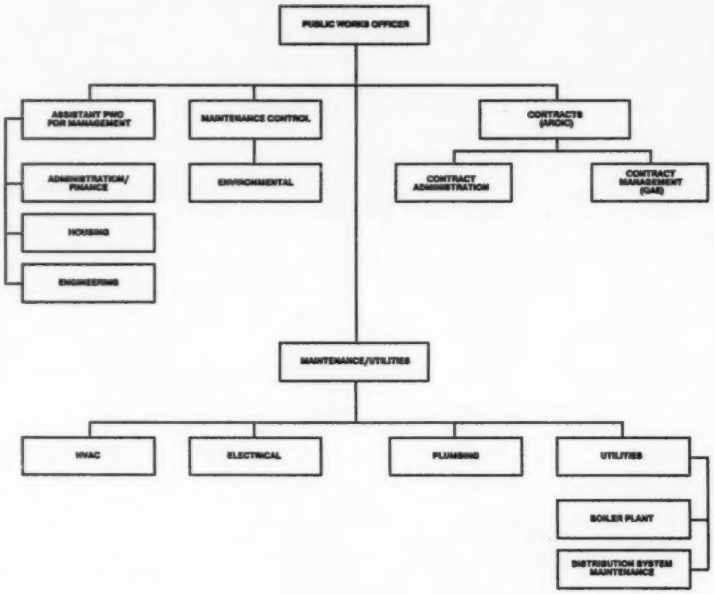

Figure 1. The ideal public works organizational structure.

training value of having an APWO responsible for all matters. Yes, we have to "grow" our PWOs somehow; in the bigger picture that may be overriding, but I believe it is a trade-off from the ideal in that the PWO can afford to be less than directly involved with maintenance control and the people who get things done--contracts and maintenance. Acknowledging that the PWO doesn't have time to have all divisions reporting directly, administration and finance, engineering, and housing are the appropriate choices for reporting to the APWO. These are not normally areas with problems that require department head attention on a day-to-day basis.

I have mixed feelings about whether the APWO for management should be a military or civilian billet. I would opt for a civilian billet which would provide a top-level management position for public works civilians to strive for and would also be the corporate memory for the organization.

The contracts division head should be a military billet. This is an assistant resident officer in charge (AROIC) for facility support contracts. This division will manage the BOS contract (if there is one); all facility support contracts such as housing maintenance and grounds maintenance; all indefinite quantity contracts such as painting, roofing, etc.; and all small-purchase contracts (less than $25K). All larger, one-time contracts would be managed by the resident officer in charge of construction (ROICC) office. One branch of the division would handle the contract administration work and the other quality assurance engineer (QAE) work.

I show an environmental branch reporting to the maintenance control division (MCD). This is somewhat arbitrary. My experience has been that correcting environmental problems generally ends up requiring MCD input. A case can be made for attaching the environmental branch to engineering or, depending on the size, having a separate environmental division, which would report to the APWO for management.

The remainder of my organization is fairly standard. These components have stood the test of time and perform their individual functions quite well. The combination of these with the new aspects discussed above provide, in my opinion, a superior organization to that which we commonly see. □

FUNCTIONS TO BE CONTRACTED

Housing maintenance
Grounds maintenance
Custodial
Painting
Carpentry
Transportation operations and maintenance
Roofing
Paving

Figure 2

RFI process provides expedient direction to construction contractors

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As construction managers we are frequently bombarded with contractor correspondence. In some cases, such as the Trident Training Facility contract, Kings Bay, Ga., several thousand letters were received within the first 12 months of construction. To cope with this, some of our Resident Officer in Charge of Construction (ROICC) offices are using the Request for Information (RFI) format to more successfully provide timely direction to our contractors.

When I was the Assistant ROICC at Travis Air Force Base, we had effectively responded to 6,400 RFIs on our $150 million Composite Medical Facility Contract. Eighty-six percent of these responses had been made within our two-week goal. In three years and after more than 1,000 prospective change orders (PCOs), no impact costs had been paid in modifications and no time-related claims received (93 percent complete). Obviously a responsive architect-engineer (A-E), customer, and ROICC office are necessary for these results, but the bubble was never lost--

MEINHARD-GRUENDERSON
A Joint Venture
Bldg. T-798
Travis AFB, CA 94535
(707) 437-3491
License# 286371

'87 NOV - PM 3 37

TO: OICC/TRAVIS
P. O. Box 1397
Travis AFB, CA 94533

PROJECT: COMPOSITE MEDICAL FACILITY REPLACEMENT
CONTRACT No. : N62474-84-C-4352

REQUEST FOR INFORMATION

DATE: 11/05/87
RFI NO. : 5781

SPEC SEC. : 01300
PARA. :
SUB: MB SUB RFIs:
AREA: G-10 FLOOR: 1
ROOM: COURT E PRIORITY: 1

SUBJECT : CURB HT @ WINDOW TYPE 96 IN COURTYARD E. REF MB : 0428 & RFI 02816
DWG. : AE.26
DET. : 10/A8.16, 6/A6.37

Information Required:

MB 428 calls for curb detail 10/A8.16 @ sill of window type 96 in courtyard E. This curb is 4 5/8" AFF (EL 68.38). RFI 02816 revised ground elevation in adjacent planter to 62.66'. This puts window approximately 1.7 ft. underground. Curbs have been poured per these details. Please advise and issue a PCO.

NOTE: This information is required to properly plan and execute CPM activity # 26508.

Date Required: 11/12/87

By:
Title: Project Engineer

Reply:

Provide a curb per detail 15/A10.16. Bend rebar as existing curb height of 3'-8" here and there.

"ANY COST IMPACTS ASSOCIATED WITH THIS REPLY WILL BE ADDRESSED BY PCO Yes IT IS REQUESTED YOU SUBMIT A COMPLETE ESTIMATE OF COST NO LATER THAN 47 Nov THIS DOES NOT CONSTITUTE AUTHORIZATION TO PROCEED."

By:
Title: Project Engineer
Date: 11 Nov 87

cc: RFI File
CEC
MB Field

Figure 1. Completed Request for Information form.

even when weekly RFI receipts exceeded 150! Management was aware of when extra emphasis resources were necessary.

The RFI process was contractually required of our hospital contractor in specification section 01011. "Requests for Information: The contractor shall forward all requests for information or requests for clarification of the contract documents to the contracting officer using the RFI form. All RFIs shall be sequentially serialized and dated." (See Figure 1.)

The RFI is much more than a form, it is the hub of our AROICC's workflow, as depicted in Figure 2. We get clearer, more directed questions from our contractor and they tend to be oriented more toward problem solving than litigation. Our A-E and our customer are automatically provided copies, as appropriate, for their information and input in developing a complete response. For government-initiated information the same format is used to notify the contractor. The RFI suffices as a record of no cost/field changes, as a modification scope description or, with the same addition of a stamp, a Request for Proposal document. Finally, the RFI becomes a source document for updating plans and specifications or assuring accurate as-builts.

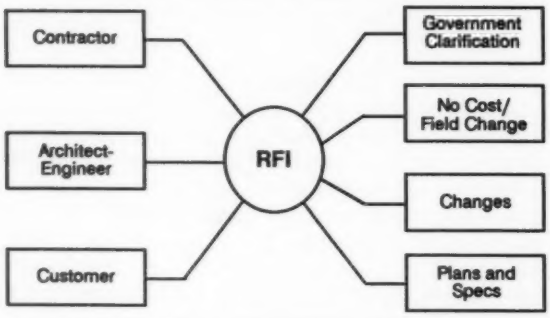

Figure 2. RFI as hub of AROICC's workflow.

> ***With the RFI we get clearer, more directed questions from our contractor and they tend to be oriented more toward problem solving than litigation.***

The standard format allows for easy logging, tracking, and filing by procurement clerks. We hand-write our answers to save time and money. We code each RFI as to whether it is a design deficiency and retain the A-E's input. The internal routing is attached for this purpose (see Figure 3).

Where office automation equipment is available, advanced information retrieval and a variety of useful man-

RFI#_____

Code	Action	Initials/Date
02.2	Log 1 Copy with Route Slip Forward to MEBJ	
811	Prepare Reply & Post Dwgs, Forward To Action Code	
_____	Action - Prepare Reply, Post Dwgs	
811	Sign	
02.2	Log Out Copies to: File,R12,R10 Board,02.3 Route one copy to: 00, AF-1, 05, 04 Mail To Contractor	

Comments:_____

DRAWING/SPEC REF CHANGE:

DESCRIPTION CHANGE:

TYPE OF RFI (Circle One)	POSSIBLE IMPACT (Circle One)
Clarification	Add
Variance	Deduct
No Cost Change	No Impact
PCO #_____	

A/E Consulted Yes No (Circle One)
A/E Deficiency Yes No (Circle One)

File: Route Slip; Answered RFI; Any Back-up info.

Figure 3. RFI routing.

```
RFI LOG for CNF Contract                (EXPLANATION)
RFI NUMBER:____                         (sequential number)
SUBJECT:_____                           (brief, key words)
DATE RECEIVED:__/__/__                  (actual)
DATE NEEDED:__/__/__                    (contractor's request)
DATE RETURNED:__/__/__                  (actual)
SPEC REF:_____                          (specification section)
SPEC REF (not printed):____             (related specification section)
DRAWING REF:_____                       (drawing numbers affected)
DRAWING REF (not printed):_____         (add'l, first field too small)
REMARKS:_____
A/E CONSULTED (YES or NO):__
A/E DEFICIENCY (YES or NO):__
TYPE (CLAR,VAR,NO COST,PCO # ):_____    (category of question)
POSSIBLE EXPOSURE (+,-,0):_             (estimate of whether a cost item)

    1 Records output
```

Figure 4. Request for information input screen (Wang alliance).

agement reports can be generated. Our Wang Alliance System input screen is a "visual memory" log which allows retrieval of any RFI or group of RFIs by knowing either the sequential number, any subject key word, date, specification reference, or drawing reference (see Figure 4). Printed reports of "in-house for action," overdue, and average age of responses are weekly management tools on this project. See Figure 5--sample RFI log total listing. (It must be noted, however, that office automation is not necessary for the RFI process to work nor does office automation make it work well, in and of itself.)

In conclusion, the RFI process is a simple management system to provide timely, coordinated direction to our construction contractors. It's the better mouse trap for correspondence. □

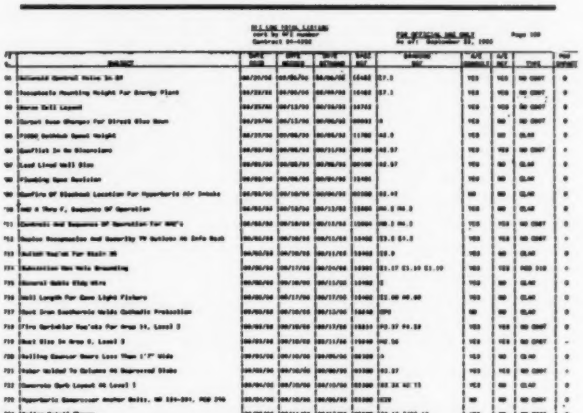

Figure 5. RFI log total listing.

MANAGING THE IMPACT OF BUDGET REDUCTIONS

Identifying cost savings in utilities operations

By S. A. WRIGHT
Utilities/Energy Management
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YOUR ACTIVITY BUDGET has just been cut by 5 percent, and your budget for next year will be cut an additional 10 percent. How are you, an activity manager, going to handle these cuts? Stop all travel? Stop all training? Defer maintenance? Hope for the best? What should you do? You can soften the impact of these cuts by identifying potential savings in utilities budgets.

Severe cuts in activity budgets are inevitable over the next several years. How utilities managers respond to these cuts could have an enormous impact on future shore utilities readiness and cost.

If we simply defer maintenance, overall utilities costs can actually increase instead of decrease. A good example of this is maintenance of steam traps. Several years ago, we realized that many of our shore activities were deferring inspection and repair of steam traps. We found that up to 23 million dollars Navywide were being lost each year due to failed traps. In addition, boiler plants were straining to meet much bigger loads than necessary because up to 20 percent of the steam generated was being lost due to failed traps. All of the surveys showed that for every dollar invested in steam trap maintenance, at least three dollars in steam costs were avoided after one year. Where can you make an investment with a return like this? Nowhere! If your utilities budget is cut, one of the last things you should stop doing is steam trap maintenance. If you stop doing steam trap maintenance, it will cost you three times what you save in deferred maintenance costs.

If some maintenance costs must be cut, the impact of deferring maintenance on each component of your utility systems should be evaluated and prioritized. Maintenance on critical components with long lead items, such as key electric substation and boiler plant components, should not be deferred since failure of these components would have a major impact on your mission--nor should maintenance on other components like steam traps and other fast payback items be deferred. Only nonessential maintenance should be deferred.

The opposite of the steam trap example is implementation of more efficient practices and procedures where there were none before. An example of this is the Naval Submarine Base in New London, Conn. This activity is

saving about $1 million per year by ensuring that the central boiler plant is being operated at best efficiency. This savings was achieved by investing about $50,000 in combustion efficiency monitoring equipment and implementing permanent procedures in the plant to ensure that best efficiency is maintained. There are opportunities like that at your activity. They may not be as dramatic, but nevertheless a careful review of your utilities management practices and procedures will result in significant opportunities.

So how can you determine what to cut in the utilities Operations and Maintenance, Navy (O&M,N) budget? The answer is through a careful step-by-step analysis.

By examining costs, current operating and maintenance procedures, and future plans for major maintenance and repair work, ways to reduce costs without detriment to mission accomplishment and condition, reliability, and efficiency of utilities systems can be found.

First, determine where utilities costs are going. Many activities have no idea what the purchase, operation, maintenance, and repair of utilities actually costs. The best way to do this is to get a personal computer and start doing spreadsheet and database analyses.

Secondly, these costs need to be evaluated in view of how utilities systems are being operated and maintained in the field. Are plants being operated efficiently? Are personnel being managed effectively? Are there written procedures for the operation and maintenance of key equipment and systems? Are these procedures being followed?

Finally, major maintenance and repair work should be reviewed. Have projects been prioritized properly? Are all projects really needed in the first place?

By examining costs, current operating and maintenance procedures, and future plans for major maintenance and repair work, ways to reduce costs without detriment to mission accomplishment and condition, reliability, and efficiency of utilities systems can be found. Specifically, you should ask the following questions:

- What is the cost of purchased electricity? Are electricity costs going up or down? Is the bill being checked against historic norms? Any anomalies? Can you save money by managing electric demand?
- How is the electric utility bill structured? Can the rate structure be renegotiated by the engineering field division (EFD) to get a more favorable rate?
- Is your utility contract a good candidate for the Navy Utility Rate Intervention Program? (A program where the Navy participates in public utility commission rate hearings to get a better rate.) Are you taking advantage of rebate or other incentive programs offered by the utility?
- What are electric system operation and maintenance costs? Can they be separated from other O&M costs?
- Is electricity being utilized prudently by customers? Are heating, air conditioning, lighting, and other equipment being turned off when not in use?

At Naval Air Station North Island in San Diego, Calif., the Public Works Center has a pilot program where electric bills have built-in incentives for customers to reduce on-peak electric demand. Unlike our standard procedure of charging the same rate for electricity no matter when it is used, at North Island electricity used during peak hours costs more than that used during off-peak hours. North Island customers can save money by reducing electric usage during on-peak periods. Could this type of rate structure be effective at your activity?

If you have a central steam system you'll want to take special care to evaluate costs. A central boiler plant can waste thousands without anyone knowing about it. What are fuel costs? Can fuel be purchased at a lower cost from a different supplier? Can a different lower cost fuel be used? If natural gas is being burned, can it be purchased at interruptable rates? Is fuel being utilized efficiently in the plant? The Submarine Base in New London has shown the kind of savings available. Is best boiler efficiency being maintained at your activity? Naval Air Station Alameda is saving about $250,000 per year by eliminating a stand-by boiler. Are unnecessary stand-by boilers being operated at your activity?

Steam and how water distribution systems can be very inefficient. Leaks due to failed steam traps, leaking valves, and other piping equipment are very costly. Repair of these leaks usually has a payback of less than four months. Insulation of bare piping is another maintenance item that has a very fast payback. Can the central distribution system be shut down in the summer or operated at reduced pressure and temperature? These actions can save a lot of money.

Other areas of opportunities are central chilled water and compressed air systems. Operating efficiencies of chillers can usually be improved through careful review of operation and maintenance procedures. Adjustment of chilled water temperatures, and operation of fewer chillers at full load rather than multiple chillers at part load can save money. Periodic repair of leaks in central compressed air distribution systems and a review of how compressed air is being used will usually result in big savings.

Budget cuts are never painless. But, with a thorough analysis of utilities costs, management procedures, and planned projects, utilities costs can usually be reduced without having a major impact on the activity. Your EFD can provide expert advice and assistance in all of these areas. □

NCEL applies new technology in developing specialized airfield cratering repair kit

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The capability to rapidly repair airfield runways gutted by bomb craters is of paramount importance to Navy and Marine Corps pilots attempting to fly crucial missions. Multi-million dollar aircraft are useless until operational take-off and landing facilities are available, especially in hostile environments.

As protected (hardened) aircraft shelters become more common, attack strategies have switched from trying to destroy planes on the ground to demolishing runways and taxiways instead. In support of such tactics, a new generation of specialized airfield cratering munitions has been developed.

Accordingly, the Naval Civil Engineering Laboratory (NCEL), Port Hueneme, Calif., is applying new technology toward the development of an air-transportable, containerized, prefabricated repair kit with the capability to repair a 60-foot diameter crater in less than two hours.

One current repair technique calls for hand construction of full-size fiberglass reinforced polyester (FRP) crater covers at a repair site using manual lay-up procedures. Alternatively, this fabrication process can be performed elsewhere and FRP sections sawed into panels for shipment to pavement repair sites. With this prefabrication procedure, bushings used to bolt panels together must be glued into holes drilled along panel edges.

Dr. James Forrest, NCEL senior research engineer and project leader, said that neither fabrication method affords quality control. For example, the fiberglass is exposed at the sawed edges and at bushing insertions, leading to accelerated deterioration from moisture. Dimensions aren't consistent, bolt holes in the bushings don't always line up, and the gluing procedure generally is not effective. Aircraft test landings also revealed that unless protective polymer concrete ramps are installed, tailhooks will catch the protruding bushings and tear the mat.

To overcome these problems, NCEL is using a recently developed automated fabricating technique referred to as resin transfer molding (RTM). Forrest said the injection molding method never has been tried for making items the size and geometry of the FRP panels (7 feet by 18 feet and 3/8 inch thick).

Each panel contains of three layers of woven roving fiberglass and three layers of continuous strand fiberglass. The new technique places pre-cut 7-foot by 18-foot fiberglass into a steel mold with the bushings precisely positioned. Polymer resin then is injected under high pressure (up to 200 pounds per square inch) to form a durable composite capable of withstanding landings by the heaviest aircraft.

A limited number of test panels were fabricated. A combination of high-polyester resin viscosity and the nonavailability of high-injection pressure molds originally had posed some difficulties. However, the panels satisfactorily tolerated load carts simulating landings by F-4 (fighter plane weighing about 60,000 pounds) and C-141 (cargo plane weighing approximately 250,000 pounds) aircraft. The panels also showed little damage after 45 seconds of direct jet blast (6600 Fahrenheit).

Workers carry a 7-foot by 18-foot fiberglass reinforced plastic panel to repair site. The section is connected to others to cover a bomb crater. This manual repair system lacks quality control.

NCEL is applying a first-ever technique that relies on resin transfer molding to eliminate many on-site problems. The new application will prevent displacement of bolts as seen above.

Benefits of the RTM technique over hand lay-up procedures are substantial. Successful application will eliminate protruding bushings, reduce deterioration, and improve quality control (tolerances, dimensions, materials).

This fall, the first extensive traffic testing of NCEL's RTM panels began at the U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Miss. Load carts will be used to simulate F-4 and C-141 aircraft take-offs and landings. Tests will include bolting assembled panels over various subsoils and under various repair site conditions. Forrest said a crucial factor will be the number of simulated take-off and landing cycles made on the panels before major maintenance is required. He anticipated at least 1,000 cycles from the F-4 and 40 cycles with the C-141.

The NCEL-developed repair kit consists of of 24 full-size 7-foot by 18-foot panels, 16 half-size panels, 16 ramp panels (2 1/2 feet by 18 feet), high-density polyethylene geo-grids for soil reinforcement, rock and soil anchors to secure panels to runways, concrete drills, bits, torque wrenches, and other specialized tools to complete crater repairs. The kit, along with the Navy/Marine Corps *Runway Crater Repair Handbook*, should be deployed this fiscal year.

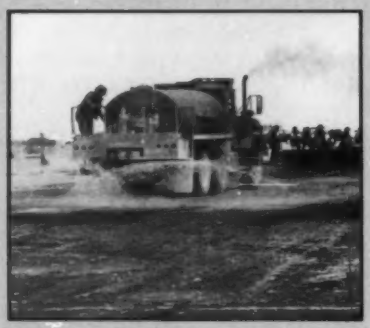
NCEL has been developing FRP soil-surfacing systems for 13 years. Initial efforts were directed toward expedient beach crossings and roads for vehicle traffic. This thrust led to the Advanced Multipurpose Surfacing System (AMASS) consisting of specialized chemicals and spray equipment to lay fiberglass-reinforced polyester surfaces in required thicknesses.

In 1984, the Naval Air Systems Command asked the Laboratory to develop the Navy's first containerized crater repair kit. The previous repair technique relied on aluminum AM-2 landing matting designed primarily to surface expeditionary airfields. In addition to being costly and posing logistics problems, the matting formed a 1 1/2-inch bump on the runway surface.

The requirement for repair kits to carry out expeditionary missions is well documented, and there is universal interest in the NCEL concept. □

GALLANT EAGLE '88

EO2 Arturo Najera, NMCB-40, of Vista, Calif., uses a front-end loader to fill in a runway crater.



NMCB-40 Seabees water down the crater fill to aid in compaction.

NMCB-40 Seabees install the aluminum matting used to cover the runway crater for aircraft landing.

Story and photos by
JOCS B. A. Cornfeld, USN
Commander, Naval
Construction Battalions
U.S. Pacific Fleet
Pearl Harbor, Hawaii

Facing an environment much like that of the Middle East, Pacific Fleet Seabees fought against time, the elements, and aggressor forces as they repaired a series of runway craters and drilled for water in the Southern California desert in July and August.

More than 200 active duty and reserve Seabees from Naval Mobile Construction Battalion FORTY's (NMCB-40's) air detachment homeported at Port Hueneme, Calif., and Reserve NMCB-16 from Los Alamitos, Calif., joined 20,000 Marines, soldiers, and airmen in the combat operations exercise Gallant Eagle '88 at the Marine Corps Air Ground Combat Center, Twenty-nine Palms, Calif.

Heading the Seabees' list of operational requirements was a rapid runway repair ("Triple R") exercise and a water well-drilling operation.

"The Triple R exercise was extremely important for the Seabees because it is the first time we have teamed up with the Marines and repaired an explosively-blown crater under simulated combat conditions," said Lt. Thomas Bersson, readiness officer and exercise coordinator for Commander, Naval Construction Battalions, U.S. Pacific Fleet. "What we wanted from this exercise was a situation where we could train the way we would fight."

Three craters--approximately 27 feet by 35 feet in diameter and 8 feet deep--were blown by Marine combat engineers the night before the Triple R and used to simulate the aftermath of an enemy bombing raid. Marines from Marine Wing Support Squadron 374, Marine Wing Support Group 37, Heavy Equipment Platoon, Camp Pendleton, Calif., repaired one crater while each Seabee battalion crew took another.

As the exercise began, equipment operators were the first to go to work, using their bulldozers, front-end loaders, and graders to fill the craters with debris left from the explosions; then the fill material was sprayed with water and compacted in lifts until level with the runway surface.

While the heavy equipment operators were at work, nearly 2,000 square feet of high-density aluminum matting sheets weighing 144 pounds each were keyed and locked together for each crater. The matting, which has a non-skid surface, covers the craters to provide increased stability for landing aircraft and more control over foreign object damage.

"The most difficult part is getting the keys lined up, locked, and keeping it square," said Senior Chief Builder Rick DeBolt, NMCB-40 air detachment and operations chief.

Average time for repairing a runway crater this size is two hours, according to DeBolt, but the Seabees and Marines finished in about an hour and a half,

NMCB-40 Seabees, in the final stages of the Rapid Runway Repair exercise, connect approach ramps on the aluminum matting.

The final step in NMCB-40's Rapid Runway Repair exercise is towing aluminum matting over the filled-in crater.

Seabees and Marines team up for combat operations exercise

within minutes of each other. He added that the focal point point of the entire (NMCB-40) operation was (Equipment Operator First Class) Mike Moretti.

The work done by the Seabees and Marines was impressive, according to Lt. Arthur Cole, assistant officer in charge of the operational Seabee detachment.

An hour's drive from the Seabees' main camp and Triple R exercise, 20 active duty and reserve Seabees drove steel shafts more than 1,000 feet into the earth as they tried to pull water from the desert.

"We had our own camp, our home for two and a half weeks," said Senior Chief Equipment Operator Jerome Longtin, officer in charge of the water well-drilling team.

Drilling was a 24-hour operation as three, four-man teams kept the 1970 model Winter-Wiess 521 rotary drill pushing 100 feet of steel a day.

"The drill has a maximum drilling depth of 1,500 feet and is the largest well drill the Seabees have," Longtin said.

The geological lay of the land and the real need for drinking water as the area is developed for more training is the reason the site was selected. "There has been no previous well drilled within a five- to seven-mile diameter of our camp," Longtin added.

Drilling for water in the desert had some special problems. The mud pump required repair parts, and drill bits had to be replaced as they bore through hard rock and sand. Also, much of the water used for cleaning fluid--trucked in from the main camp--was lost by evaporation and percolation.

The well shaft reached 1,005 feet before the exercise ended, and conditions for a working water well were just right, according to Longtin.

"This is the deepest water well the Seabees have drilled for us in a JCS (Joint Chief of Staff-sponsored) exercise," said Marine Corps Major Don Todaro, I Marine Expeditionary Force engineer officer. The Marines will develop, flush, test, and cap the water well.

"The Marines we supported now have a better understanding of our capabilities, and we now have a stronger awareness of our responsibilities in supporting them in contingency operations," said LCdr. George Haines, officer in charge of the operational Seabee detachment. "Both of these evolutions gave us a chance to identify human and equipment strengths and limitations while operating in a harsh desert environment."

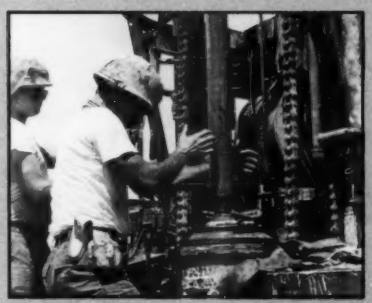
In addition to the Triple R and water well-drilling operations, the Seabees completed more than 22 other projects during the three-week Gallant Eagle exercise, including constructing a metal laundry facility, grading a C-130 airstrip, placing concrete at various sites throughout the Marine base, and building ammunition bunkers.

"It's the spirit of the Seabees." said DeBolt. "When the men do a job, they finish it the best they can and make it functional." □

UT3 Chris Haynes, NMCB-40, of Stone Mountain, Ga., finds that participating in an exercise with Marines in the Southern California desert isn't completely isolated.

NMCB-40 Seabees enjoy a little rest after the hard work.

A 30-foot-high water well-drilling rig was used to drill more than 1,000 feet in the Southern California desert at the Marine Corps Air Ground Combat Center, Twenty-nine Palms.



EO2 Scott McKensie, NMCB-40, of Troy, Mich., (left) and EO3 Alfonso Alvarez, RNMCB-16, of Apple Valley, Calif., add drill steel to the water well-drilling rig.

EO3 Alfonso Alvarez, RNMCB-16, (left) and EOCN Troy Foote, NMCB-40, of Raymore, Mo., test drilling fluid viscosity.

news worth reviewing

'Triple R' conference held at Gulfport

The Navy's first rapid runway repair ("Triple R") conference was held recently at Gulfport, Miss., with attendees representing over 30 different commands from all branches of the Armed Services and the British Army Royal Engineers.

The conference, expected to be an annual event, provided an opportunity to exchange information and get a direction for expanded training and the requirement for low-technology, high-success repairs in life-threatening conditions.

Attendees were introduced to Regulated Set Portland Cement (RSPC), a controllable rapid-set concrete that is durable, easy to use, and cost effective--it's ready to use in two hours and has an indefinite shelf life when stored in a moisture-free environment. A RSPC demonstration was held with members of Naval Mobile Construction Battalion SIXTY-TWO providing the manpower.

The final phase of the conference was presented by Major Carl Zimmerman of the British Royal Engineers who presented the United Kingdom's rapid runway repair initiatives, including their dynamic compactor which is used for compacting upheaval, a flood grout system of crater-capping similar to RSPC, and a special anchor developed for anchoring fiberglass matting to asphalt.

World War II Seabees to reunite

The 115th Naval Construction Battalion veterans (Navy Seabee outfit, World War II) will hold their 20th annual reunion July 27 through 30, 1989, at the Northampton Hilton Inn, Routes 91 and 5, Northampton, Mass. 01060, telephone (413) 586-1211.

For further details, contact Edward C. Plummer, 5023 East Naomi Street, Indianapolis, Ind. 46203; telephone (317) 359-6990.

Members of NMCB-62 provide demonstration of Regulated Set Portland Cement (RSPC) for attendees of the first rapid runway repair conference held at Gulfport recently.

NMCB-1 Seabees trained in cold weather for their field exercise held last March in Fort Drum, N.Y.

Seabee battalion trains in cold weather

Last March, Naval Mobile Construction Battalion ONE, homeported in Gulfport, Miss., traveled to Fort Drum, N.Y., to hold their field exercise. Cold-weather training was added to their training--the men learned land navigation with snowshoes, cross-country skiing, and cold-weather construction.

An added twist to this not-so-normal field exercise was that the men traveled via railroad from Hammond, La., to Fort Drum, N.Y.

Tribute to Seabees at Navy Memorial

The Lone Sailor statue standing vigil on a 100-foot diameter granite map of the world is known as the Navy Memorial. This national tribute to every man and woman who serves or served in the U.S. Navy, located on Pennsylvania Avenue halfway between the Capitol and the White House, is about to get even better.

Bronze bas-relief sculptures with designs honoring Navy communities and commemorating events in Navy history are now being commissioned to form a semi-circle lining the perimeter of the monument. One of these sculptures will depict the role that the Seabees have played since their beginning in 1942.

The development of the Seabees' sculpture will be a joint effort between the Navy Memorial Foundation, the artist, and Seabee representatives. Since the sculptures will be funded only through private donations, the design process cannot begin until there is a reasonable show of financial interest. With a successful fund-raising campaign, the Seabees' sculpture can be one of the first to be commissioned and put in place. All that is needed is $50,000; any funds raised in excess of that amount will go to Seabee Memorial Scholarship Association general scholarship fund.

For further information, contact Cdr. Ron Keene, CEC, USN, at (202) 325-8561 or Autovon 221-8561.

instructor in the spotlight

EAC Kristen R. Iverson, USN

Naval School
Civil Engineer Corps Officers
Port Hueneme, Calif.
Specialty: Naval Construction Force Microcomputer Instruction

Engineering Aide Chief Petty Officer Kristen Iverson joined the staff of the Naval School, Civil Engineer Corps Officers (NAVSCOLCEC-OFF, or "CECOS") in February 1986 as an instructor in the Military Readiness Division. Although he has primarily been responsible for curriculum development and instruction in the Naval Construction Force (NCF) Microcomputer course he has also served as an instructor in Seabee Construction Management, Construction Battalion Operations, and the Civil Engineer Corps (CEC) Basic Officer Qualification course.

Chief Iverson's unique combination of practical construction experience and exceptional technical knowledge with computers has allowed him to deliver a construction management training package to the Seabees and CEC officers coming to CECOS that will benefit the NCF for years to come.

EAC Iverson was born in Waltham, Mass., and grew up primarily in McLean, Va., while his father, a retired Navy commander, served in Washington, D.C. He received an Associate's degree in Architectural Technology from Northern Virginia Community College just prior to enlisting in the Navy in 1974.

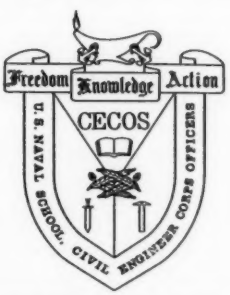
His first assignment was with Construction Battalion Unit 416 in Alameda, Calif. Since then he has served with the Naval Support Force Antarctica; Naval Construction Training Center; and Naval Mobile Construction Battalions THREE, FOUR, and FIVE, Port Hueneme, Calif.

Chief Iverson has been a very active member of the community during his years at Port Hueneme. While at CECOS, he's been the command's nominee to the Port Hueneme Chamber of Commerce as "Military Person of the Year," and he was awarded the Navy Achievement Medal for the superior performance of his duties. In the local community ehe is active in the Cub Scouts and serves as a stage director the the Ventura Recreation Service Children Dance Group.

When he isn't busy with these duties--not very often--he enjoys spelunking, riding his unicycle and working with computers.

EAC Iverson and his wife, Ruth, reside in Port Hueneme, Calif., with their two sons, Ivan and Samuel.

NAVSCOLCECOFF provides course of instruction for Civil Engineer Corps officers, other naval officers, officers from other Armed Forces, foreign officers, Seabee chief petty officers, and civilian employees of the Department of Defense. Twenty-nine different courses are offered and are designed to respond to the training and development needs of personnel in naval facilities engineering, naval construction battalion operations, engineering management, and allied disciplines, and to acquaint them with the specialized administrative and technical information necessary to function effectively in those fields of endeavor.



By LT MASON CRUM, CEC, USNR
Military Readiness Division
Naval School, Civil Engineer Corps Officers
Port Hueneme, Calif.

Seabee detachment to Diego Garcia supports Navy's environmental protection efforts

By VICTOR YAO
P.E., Hawaii
Environmental Engineer
Pacific Division
Naval Facilities Engineering Command
Pearl Harbor, Hawaii

EARLIER THIS YEAR, 30 Seabees from Naval Mobile Construction Battalion SIXTY-TWO (NMCB-62) successfully constructed three fuel recovery wells on the island of Diego Garcia, an atoll in the Indian Ocean located south of India. This type of recovery well system represents the first of its kind installed by the U.S. Navy in the Pacific and Indian Ocean areas. This project will provide the Navy with first-hand experience on the effectiveness of the current state of technology in underground fuel spill cleanup.

The site is located in the industrialized area of the air operations, around the eastern corner of the north parking apron. The culprit was a leaking fuel line which spilled an unknown quantity of JP-5 in the ground. This line was replaced in 1984. The underground spilled fuel was brought to the attention of the Pacific Division, Naval Facilities Engineering Command, shortly after an earthquake registering 7.6 on the Richter scale hit the island in 1984. The earthquake was reported to have caused the fuel to gush out of the ground through some old test holes left in the air operations area.

A series of monitoring wells were subsequently drilled throughout the site, in areas that were accessible and free of underground utilities. The apparent fuel thicknesses measured in some of the monitoring wells were found to exceed 29 inches. However, the full extent of the fuel contamination, both area limit and quantity, could not be determined because of the widespread interference from buildings, parking apron, and underground utilities. Due to the interference and space constraints, the use of recovery wells was judged to be the most feasible means by which to recover the spilled fuel out of the ground, including otherwise inaccessible areas under the hangars, operational buildings, and the parking apron.

The recovery well system was designed to accommodate the scavenger skimmer and lower the water table sufficiently to draw the spilled product into the well. The skimmers were readily available since they had been previously purchased and used in a fuel recovery project undertaken by the Seabees at the Diego Garcia old fuel farm area. Unlike this project, the recovery method used at the old fuel farm was based on the interceptor trench system.

The casing for the recovery well system is 36 inches in diameter and its section exposed to the groundwater is slotted with 1/4-inch groove openings. Three-fourths-inch gravel packing was provided all around the outside of the casing as filtering material. The minimum depth specified for the well is 14 feet which provides a maximum drawdown of approximately 4 feet relative to the mean low water table. Other equipment appurtenances that are an integral part of the well system include a water depression pump and piping system, and a level control float switch to control the depression pump. Also included in the project is a French drain system, measuring 120 feet long, 3 feet wide, and 4 feet deep, to receive and recycle the discharges from the depression pumps back into the ground. To achieve the level of drawdown required, the sizing of the water depression pump was closely coordinated with hydrologists from the U.S. Department of the Interior Geological Survey (USGS) office in Honolulu who were intimately familiar with the characteristics of Diego Garcia groundwater resources.

The detachment from NMCB-62 on Guam, led by Lt. J. Orlowsky, was tasked to construct the wells. Because the end of its deployment was nearing, the detachment had to complete the wells along with several other concurrent projects within three weeks from the date of my arrival. The construction of the recovery wells required various degrees of input from all the trade resources commonly found in a detachment of this size.

The key to installing the well was to successfully excavate down to the required minimum depth of 14 feet. This depth was reached only after taxing the operational limit of the grade-all equipment used for excavation. We were fortunate to have encountered sand and coral fragments rather than just sand alone throughout the well excavation, which would have required shoring or the use of outer casing to attain the desired depth.

When the last well was completed, over 11,000 gallons of fuel were removed from the ground.

Two unforeseen glitches made in the design/planning of the recovery well system had to be corrected. The depth of the French drain system was wrong and the 55-gallon drums were too limited in capacity to keep up with the rate of fuel recovery. The Seabees had to construct an overflow piping system for the French drain and refurbish and install two fuel tanks to support the recovery operation. Through their dedication and perseverance, the project was completed on schedule.

When the last well was completed on March 12, 1988, over 11,000 gallons of fuel were removed from the ground. This high rate of fuel removal was due to the placement of wells in areas with heavy concentrations of spilled fuel. The rate of fuel recovery is expected to drastically taper off as the heavy concentration of fuel is removed from around the wells. However, the ultimate success of the recovery wells would depend on how well fuel can drawn from the outer reach areas. The installation of reference wells to gauge the long-term performance of the recovery operation will be conducted when an auger is available on the island.

I want to thank all the Seabee detachment personnel who were involved in this project. The successful completion of the wells attests to their professionalism and dedication to support the mission of the Seabees and the Navy's environmental protection efforts. □

A leadership opportunity for CEC junior officers

Officer in charge of a Seabee unit

By LT MARK D. BUFFKIN, CEC, USN
E.I.T., S.C.
Officer in Charge
Naval Construction Battalion Unit
FOUR ZERO NINE
Long Beach, Calif.

If you are a junior officer in the Civil Engineer Corps and you want a job that really puts your technical "smarts" and leadership potential to work, then ask your detailer to put you in charge of one of the Navy's 23 construction battalion units (CBUs) if you consider yourself confident enough to initiate decisions and give orders to your own command. As an officer in charge (OIC) of one of these Seabee units you will rarely be given guidance or directions from a superior, but you may often be asked for guidance from your subordinates. A CBU is a great experience, and I've never heard a former OIC deny it.

As the Chief of Naval Operations defines it, the mission of a CBU is to be fully prepared as a contingency construction capability, to conduct military and technical skills training, to provide disaster recovery assistance, and to perform construction projects and self-help assistance to the furtherance of this intent. The Fleet Hospital Unit Program may be added to our mission as well, and as of this writing the Seabee Division of the Naval Facilities Engineering Command is continuing to work on the best solution for this assignment. You as the OIC must decide how to turn this broad mission into achievable tasks for your unit. You can take the upper hand in this process and push for projects you want, or initiate projects that will give your Seabees the training they need. You decide, through your own devices, how, when, where, and how long you want to conduct a field exercise. You can drive the unit to success or you can probably sit and let the unit drive you to wherever. The bottom line is that you are the one held responsible.

What makes this job any different from being an officer in a naval mobile construction battalion (NMCB)? I was a detachment OIC in NMCB-5 and from the outside the jobs looked similar. But as a CBU OIC you have nonjudicial punishment (NJP) authority, you can select or deny your own projects, you control your operating target (OPTAR) budget, and you are treated by your host activity as a tenant command. You have a lot more room for creativity as a naval leader--as long as you are meeting your commitments to your commanding officers. Also, women Seabees are functioning within the CBUs, and have the opportunity to be OICs.

What you gain from being a CBU OIC depends on what you do while you're there. You'll have opportunities to improve in almost any way you want, but what is more important is what your Seabees gain from you. An officer's prime responsibility is to develop people and make the most of their talents. The purpose is to make a better and stronger military; to borrow a quote from General George Marshall. You can't let your command turn into just another work force for the base, although many people will try to make you into one. A CBU may "can do" themselves to destruction if not careful.

If what you've read here appeals to you, you'd probably enjoy being the officer in charge of a construction battalion unit. An officer with orders to a CBU, who has no prior NMCB experience, should spend at least a week TAD to another CBU before reporting to the new command. CBUs are an important factor in the Seabee/Facilities Program. The opportunity is there for any OIC to make a significant impact on the quality of life at your station. You will certainly have a chance to have a great time working with a group of outstanding Seabees. □

Women in the CBUs actively function in their Seabee ratings.

You select the projects that keep your people trained in the skills they need.

CBU-409 initiated earthquake drills for Navy housing residents in the Long Beach, Calif.

Reserve Seabees excel in 'Wooden Fist' exercise

Story by ENS BRADLEY POSADAS, CEC, USNR
Assistant Alfa Company Commander
Reserve Naval Mobile
Construction Battalion SEVENTEEN
NCBC Port Hueneme, Calif.

Photos by PHSN Charles Cameron, USN

Reserve Seabees "can do"! During the last two weeks of July 1988, 150 reserve Seabees from Reserve Naval Mobile Construction Battalion SEVENTEEN (RNMCB-17), commanded by Capt. Clifford H. Royal, CEC, USNR, participated in "Wooden Fist," a 14-day combat contingency construction exercise. The exercise was a tactical one and, under the instruction of the 31st Naval Construction Regiment, ensured that the reserve Seabees learned how to erect Advanced Base Functional Component (ABFC) projects as well as how to defend themselves against the enemy.

The scenario was based on a fictitious assault on the mock island of "Anapuma" in the "Malalim Ocean." During their Active Duty for Training (ACDUTRA) period at the Naval Construction Battalion Center, ABFC Training Area, Port Hueneme, Calif., 21 construction projects were completed, nine more than scheduled for the two weeks.

Among the projects constructed during this short timeframe were rapid runway repair, timber observation tower, timber bridge, Bailey bridge, strongback tent, pre-engineered building, water well drilling, and two Seahuts.

According to Senior Chief Builder William Rogers, the battalion's active duty supervisor, "the guys did real well . . . the

The Seahut crew gets ready to place the wall on the Seahut's floor foundation.

entire battalion including the active duty staff worked hard." An example of such effort was displayed in the rapid runway repair project during night operations.

A 30-man rapid runway repair crew put together a panel patch over a 30-foot diameter hole, which simulated a bomb crater on a concrete runway section. The crew completed the project in a new record time of 49 minutes, beating the previous record of 57 minutes set by RNMCB-18 earlier this year.

The training exercise included visits by Capt. Carl F. Gott, CEC, USNR, Commander, Naval Reserve Readiness Command, Region 19; Capt. R. Lee Biggers, CEC, USNR, Commander, First Naval Reserve Construction Regiment; several commanding officers from various Navy and Marine Corps Reserve Centers; and eight civilian engineers including Dr. Charles K. Smith, head of the Amphibious and Advance Base Department of the Naval Civil Engineering Laboratory.

At the end of the exercise, several awards were given.

An equipment operator levels a bomb crater on the concrete runway before the panels can be placed.

Equipment Operator Constructionman Smith received the "Constructionman of the Exercise" award, while Construction Mechanic Second Class J. Shelton received the "Petty Officer of the Exercise" award.

Alfa Company, under the command of Lt. Stephan McCarel, CEC, USNR, received the "Cock of the Walk" company award for sustained superior performance throughout the year.

A comment from Equipment Operator First Class Richard Baptista summed up the success of this Active Duty for Training, "ACDUTRA ran smoothly for the battalion and it functioned like an active battalion, if not better . . ."

The men of RNMCB-17 expressed their appreciation for the excellent training received. This type of exercise will be scheduled again in the near future.

Reserve Naval Mobile Construction Battalion SEVENTEEN is currently comprised of approximately 700 reservist and 5 active duty personnel. This "desert" battalion is made up of 10 detachments, having personnel geographically located from Southern California, Nevada, and Arizona.

Concurrent with the "Wooden Fist" exercise, smaller detachments were sent to perform their Active Duty for Training in Hawaii and the Republic of the Philippines. □

Ens. B. Posadas, CEC, USNR times rapid runway repair crew, night operations, as they place final panels together. They set a new record of 49 minutes.

Volunteers build homes for Appalachian poor

By LCDR GEORGE ZISKA, JR., CEC, USN
P.E., Ill., Neb.
Staff Structural Engineer
Joint Strategic Target Planning Staff
Offutt Air Force Base, Neb.

Why would high school and college students sacrifice one week of summer break; business professionals give up one week of vacation time; or a retiree leave his "easy chair" to build houses for the poor of Appalachia?

The answer lies in their deep concern for improving the living conditions of others less fortunate and the sense of accomplishment and immediate positive impact which construction work brings.

My father, George Ziska, Sr., of Omaha, Neb. (a 76-year-old retiree), and I contacted the volunteers of the St. Francis Appalachian Outreach Program of Naugatuck, Conn. Father Dennis Hanley, Chaplain, 1st Lt., USAF of the Offutt Air Force Base Chapel started this program while at St. Francis Church, prior to his military service. Each summer for the past four years, volunteers from St. Francis Church have gone to McCreary County, Ky., to build, remodel, or repair homes for people without the financial means to live in relatively acceptable housing.

The program is a year-round project to raise funds for construction materials and logistics costs for the volunteers. Mrs. Cathy Retkowski and Mr. Al Pistarelli are principal coordinators and fundraisers for the St. Francis Appalachian Outreach Program in Naugatuck. Sister Nancy Sutton, C.S.J., of the Good Shepherd Catholic Mission in Whitley City, Ky., is the local overall coordinator for the house-building program. Sister Nancy determines which families will receive help based on need.

Families selected for new homes must own the property where the house is to be built and promise to pay back the cost of materials in small monthly payments (as little as $20 to $30). However, the families more commonly pay back material costs by receiving credit for the time they spend working on their houses and other houses built by the program. Without this program, the selected families would have great financial difficulty in qualifying for a mortgage to obtain adequate housing.

After a 900-mile trip for the 11 volunteers from Naugatuck, Conn., and a similar distance trip for my father and me (representing the Offutt Air Force Base Chapel), work began on Monday, July 18, 1988.

The week's work was divided between two house-building sites. Both houses featured a practical and traditional single-story, 24-foot by 36-foot floor plan, as shown in Figure 1, consisting of three bedrooms, a large kitchen/living room, a small room for a future bath, and a front porch.

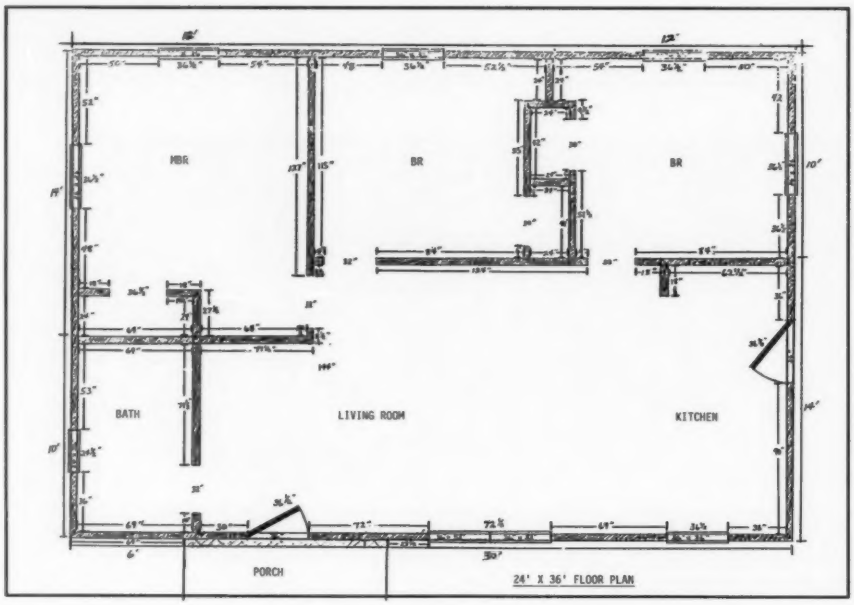


Figure 1. Both house-building sites featured this practical and traditional 864-square-foot floor layout.

Primary house-building site on Day 1--started with basement walls completed.

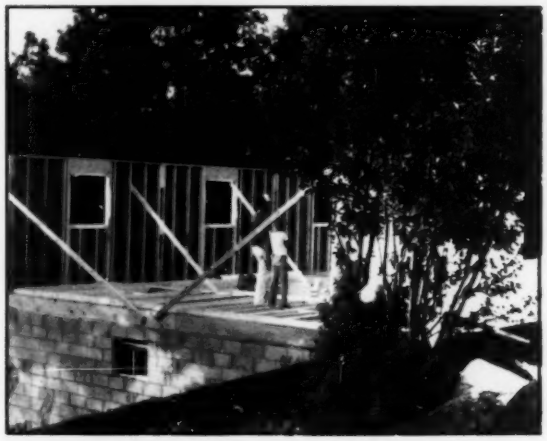
Secondary house-building site on Day 1--mainly finishing work was needed.

The homes will be heated by a wood stove centrally located in the kitchen/living room. County water has just reached the area of the job sites, known as Sawyer, Ky., some 20 miles northeast of Whitley City. As a result, indoor running water is a future goal of homeowners.

AT THE PRIMARY JOBSITE, the main objective was framing the house from the basement foundation walls to the roof. While at a secondary jobsite, most of the work consisted of completing interior wallboard and flooring and exterior siding on a house built by a previous volunteer group.

The first day's activities were all at the primary site and included waterproofing the basement walls, installing the floor beam and joists and the plywood sheeting. On Tuesday, work at the primary site included placing permanent columns under the floor, framing/erecting front and rear exterior walls with insulation board, and building other exterior walls. At the secondary job site, the second day's finished work included installing gypsum board ceiling in the bedrooms and living room. On Wednesday, primary job site work included completion of framing/erecting of all exterior/interior walls and waterproofing the exterior plywood siding before installation. Work at the secondary site included completing the ceiling board and wallboard in two bedrooms.

Due to heavy, drought-breaking rains the night before and on Thursday morning, the volunteers were not able to install the roof trusses at the primary site so all work was diverted to the secondary site, where the wall board installation, plywood floor covering, and exterior siding were nearly completed. On Friday, all work was at the primary site and included installing 19 prefabricated roof trusses and the plywood roof sheeting and completion of the front porch decking. To help make up for rain delays, the volunteers worked Saturday morning placing roof tarpaper and shingles and the roof framing for the



Erection of exterior walls began on Day 2 at the primary site.

Siding installation at the secondary site.

McCreary County is located in Southeastern Kentucky and is one of the economically poorest areas of the state. With a population of approximately 18,000 people, unemployment is officially at 27 percent, but when people who have stopped seeking jobs are considered, unemployment exceeds 50 percent. Two-thirds of the county is within the Daniel Boone National Forest and another portion is in the Big South Fork National River and Recreation Center, so that local property tax base is small.

Due to poor soil conditions and rugged terrain, no commercial farming is done in the county. Industry is limited to three small factories which pay minimum wages. The largest deep coal mine has closed and 250 employees were laid off. Logging is limited to small three- to four-person operations on tracts purchased from the U.S. Forest Service. Although Cumberland Falls is a major tourist attraction in the county, the tourist facilities are located in an adjacent county so McCreary County receives little tourist revenue. The largest employer is the county school system.

The people have a strong, religious background, as indicated by over 50 churches in the county, even with estimates that 40 to 50 percent of the population is unchurched. Into this environment entered the Good Shepherd Catholic Mission which was established in 1974 as the only Catholic church in the county. The Mission opened in a former taxi garage for Whitley City and now serves as the chapel and convent for four sisters of St. Joseph. Father C. Howlin also lives in Whitley City and is the only priest for the county.

The Mission plays a significant role in helping all the people of the county. A prime example is the Christian Care Center which was started by Sister Lorraine Ayotte, C.S.J., of the Mission six years ago. The Center is now supported by 12 churches and the four local medical doctors and provides free medical care, education, clothing distribution, and food to the many poor of the county. In addition to the summer house-building program, the Mission, with the help of volunteers from Illinois and local construction workers, is building a four-bedroom shelter for the temporary homeless. A significant number of families become homeless due to house fires caused by wood-burning stoves, complicated by limited volunteer fire department protection and low water pressure.

Day 5 work at the primary site included installing roof trusses.

Day 6 work at the primary site included roof shingling.

front porch. Upon completion of the volunteers' week of work, the house at primary site was nearly ready for the locally licensed electrician and subsequent finish work, and the secondary job site was very close to occupancy.

This experience was truly an "eye opener" to a wider world of volunteerism. The crew of volunteers gave a week of their time to help someone they didn't know. They received a lot of satisfaction in helping two Appalachian families improve their living conditions.

The need for adequate housing in this country was identified by former President Carter's work with Habitat for Humanity in the inner city and, as addressed by the St. Francis Appalachian Outreach Program, in a rural Appalachian area it cannot be over-emphasized. We may think that we do not have the time or ability to build homes for our fellow Americans living in economical conditions which will not allow a minimum acceptable standard of living; however, we all bear a certain responsibility to take action for improving the situation. □

How can military engineers improve their mobilization contracting readiness?

By CDR RICHARD F. COWAN, CEC, USNR
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What more can military engineers do in peacetime to allow private architects-engineers (A-Es) and construction contractors to quickly respond in an emergency or national mobilization?

What changes upon mobilization?

The peacetime A-E and construction contracting methods used by Department of Defense (DoD) construction agencies are well understood by the private design and construction communities. In a mobilization situation, these well-understood methods will change dramatically in three major areas.

• *Contracting policies and techniques.* The existing law, Title 10 of the U.S. Code, allows upon head of agency finding of a public exigency or upon Presidential Declaration of a national emergency:

- Exception to formal advertising, using selection of competitors.
- Exceptions to fixed price purchases, using cost-plus-fee contracts for design and construction.
- Reprogramming of military construction (MILCON) funds appropriated but not obligated.
- Construction on land not owned fee simple by the government.
- Purchase of land without specific congressional line item appropriation.
- Emergency MILCON without specific congressional line item appropriation.

These authorities may be sufficient for an extensive emergency program, and require no more congressional action. They allow contracting techniques responsive to the mobilization revised policies, such as:

- Source selection in lieu of synopsizing and formal advertising
- Oral solicitation
- Oral bidding
- Letter contracting
- Defining a letter contract to one of the cost and fee formats

• *The pace and speed of response to construction needs and the greatly increased authority delegated to lower levels.* To an entire generation of officers, civilians, and contractors whose careers have been shaped on the federal government's peacetime caution for public scrutiny, fixed procedures, approvals by higher authority, and long funding cycles, it will be asking the impossible to expect immediate understanding of the response times needed to execute the mobilization mission. Most of these people will not know of the authorities, laws, and regulations already existing for mobilization contracting. Overcoming their mindset and expectations will be a formidable task.

• *The changed hierarchy in methods of obtaining needed facilities.* Instead of first looking to MILCON design and construction in peacetime, military engineers, and contracting officers will instead consider (in order):

1. Leasing, acquiring, or obtaining needed facilities by use agreement (instead of building a warehouse inside the fence, lease one outside)

2. Outlease or license of government land for construction by public works industrial contractors (instead of contracting for the design of a barracks, outgrant the land to a major hotel and lease the fully operated barracks once they have built it)

3. Conversion, remodeling, and restoration of existing facilities

4. Temporary construction such as tents or air-supported fabric shelters

5. Expedient construction as described in the Navy's Advanced Base Functional Components, civilian pre-engineered facilities, or the Army's "m" designs

6. Hard construction using A-E site adaption of standardized military designs

Note that only last in this heirarchy is "peacetime" style construction used, and then on an accelerated basis.

How will the military engineer react?

In an emergency or mobilization, each local military engineer and contracting officer will first look to A-E or construction contracts already open. Some contracts he/she will terminate, some will be accelerated. Others may be modified in scope (i.e., increasing the quantity of warehouses to be built) or modified as to type (i.e., from fixed price to unit price, or modified out-of-scope (i.e., to call for design of facilities adjacent to one already under design.

If the contracting officer is administering a job order contract for public works-type maintenance, repair, or renovations, he/she may place additional orders against it and perhaps modify its dollar scope upward. If the contracting officer has in place open-end or indefinite delivery-type contracts for design, testing, or inspection services, he/she may place additional orders against these contracts.

63 basic CEC students graduate

Sixty-three members of basic class no. 186 graduated on Dec. 9, 1988, from the Naval School, Civil Engineer Corps Officers, Port Hueneme, Calif. The class completed eight weeks of specialized training pertinent to the Navy's needs for shore installation engineering, public works management, construction contracting and administration, and Seabee operations.

Ten graduates finished with honors, nine with distinction. CWO2 Johnny D. Hunter was the outstanding graduate of the class. Those students graduating with distinction were: Lt. Robert S. Clarke, Ens. Scott D. Bailey, Ens. Andrew N. Bolt, Ens. John A. Csellak, Ens. Eugene F. Drake, Jr., Ens. Kenneth A. Feldman, Ens. Margaret M. Skelly Ens. Leslie S. Steele, and Ens. John T. Weger.

CWO2 Hunter's photograph is indicated by an (°), and those graduating with distinction are indicated by a (•). Those entering Seabee duty are indicated by a (†).

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When facility requirements call for new A-E or construction contracts, the military engineer will find him/herself in competition with other agencies for these services. Some regional coordination by the Federal Emergency Management Agency (FEMA) may be needed, as called for in Executive Order 11490.

The military engineer will want to select the source of design or construction services best able to respond to his or her requirement. Each military engineering headquarters maintains a file of architect-engineer qualifications (Standard Form 254) and contractor bid lists and qualifications (Standard Form 129). The accessibility and completeness of these lists is important. Nationally, the Society of American Military Engineers (S.A.M.E.) has initiated Operation Fast Start which tasks each post with inventorying and describing the A-E and contractor capabilities in each geographic area, describing non-DoD contracting agencies and their capabilities, and obtaining a commitment from S.A.M.E. industry members to stand by for quick response.

If these lists and the fast start plans are complete and accurate, a military engineer may find that firms are already "prequalified" in the sense of proven past financial bonding capacity and technical experience. A prequalified contractor, however, is neither bound to respond nor is the government bound to call upon him/her. Since the objective is not merely a prequalified designer or contractor, but one hard at work on the emergency mission, there is more to be done.

The contracting officer may use any of the expedient contracting techniques not used commonly in peacetime but, as mentioned above, allowed and described in the law and the Federal Acquisition Regulations--source selection, indefinite delivery (open-end) contracts for A-E design, testing, or inspection, government-furnished materials or equipment, oral solicitation, oral bidding, letter contracts, cost-plus-fee contracts, additional job order contracts, and design-build contracts.

How can the military engineer be more ready?

What more can military engineers do in peacetime? The following actions are recommended:

- Train mid-career civilians and officers in emergency and mobilization contracting methods--including authorities, law, the Defense Production Allocation System, real estate possibilities, mobilization criteria and designs, cost contracting, and the role of FEMA. Many of the DoD peacetime professionals and military officers have had no training in these subjects, and of course the staff which would be new to DoD in an emergency knows nothing of them.

- Test these skills by involving engineering commands in exercises.

- Use mobilization-style authorities and techniques whenever response to a national emergency is called for.

- Require each engineering headquarters to perform some cost contracting in peacetime to expand knowledge of this area.

- Conduct briefings on military expectations in an emergency for the A-E contractor community who are most likely to be involved in mobilization contracting. The S.A.M.E. is an excellent forum for this.

- Investigate the appropriateness of mobilization memoranda of agreement with local non-DoD contracting agencies such as major state highway departments, water districts, utilities, etc.

- Task the commander at each military emergency headquarters with improving the accessibility and completeness of his/her A-E and contractor source listings.

- Task the senior military engineer officers in each geographic area with lending active support to S.A.M.E.'s Project Fast Start.

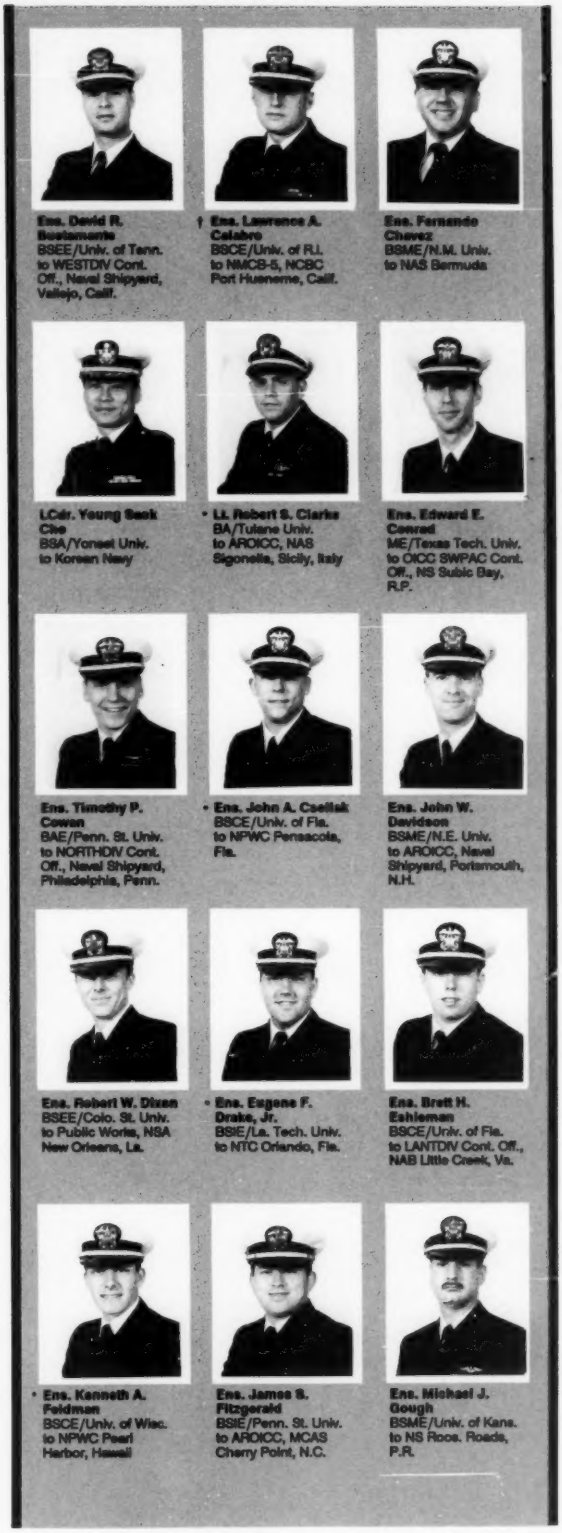
- Clarify the coordination role which FEMA may have in emergency and mobilization response by DoD agencies.

- Award indefinite delivery A-E contracts to those firms best technically suited to respond to emergency or mobilization designs in each geographic area. Some such contracts have been awarded already.

A great deal can be done in peacetime to ensure military officers and civilian engineers are fully ready to mobilize the private design and construction community. Military engineer commanders owe it to the nation to make readiness a peacetime mission, not a wartime reaction. □

The Reserve Division of the Naval Facilities Engineering Command will host the third offering of its Mobilization Contracting Course at the Naval School, Civil Engineer Corps Officers (CECOS) from July 10 through 21, 1989. The course covers wartime authorities and exceptions to formally advertised and fixed-price contracts, wartime reprogramming of MILCON appropriations, cost-plus-fee contract administration, use of civilian and military expedient designs, design-build construction, and wartime real estate authority and actions.

Quotas have been assigned to Reserve Division commands, but quotas are being held for up to 20 active duty CEC officers, reserve CEC officers in RNCF or RWCM, or NAVFAC civilians in planning contracts or construction positions. Quotas may be requested prior to May 20, 1989, from the Commander, Reserve Division, Naval Facilities Engineering Command, Code 061, Suite 2, 1950 Century Boulevard, Atlanta, Ga. 30345.



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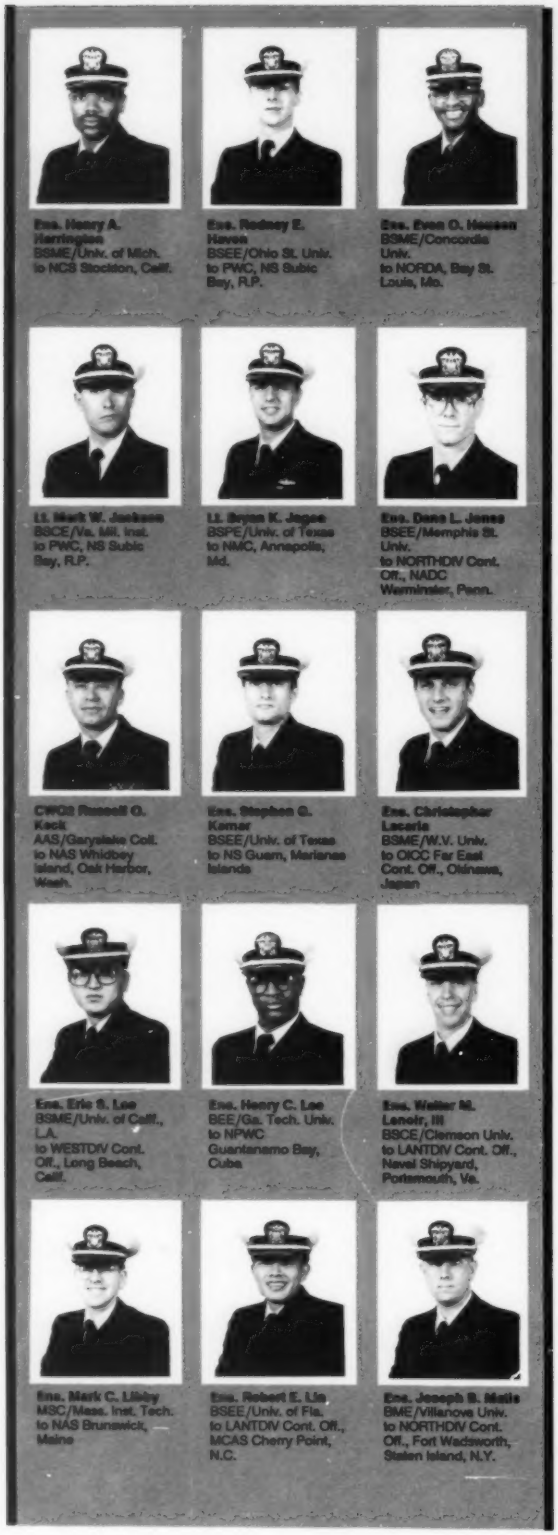

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Can we prevent contract claim disputes?

By LARRY C. MILLHOUSE
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Naval Facilities Engineering Command
Charleston, S.C.

THE CONTRACT DISPUTES ACT OF 1978 gave Naval Facilities Engineering Command's (NAVFAC's) contractors the contractual right to a quick and decisive response to their claims. As contractors have become more adept at using the disputes clause to their advantage, NAVFAC has become more efficient and responsive in handling the claims. But it is clear that we must also pursue another approach to the claim problem--we must find ways to prevent them.

Contract administrators obviously do not have total control over whether or not a dispute develops on a particular contract. Equity without the use of the disputes clause requires the agreement of both parties to the contract. But contract administrators can minimize the number and severity of disputes in a number of ways, all of which fall under the general heading of alert contract administration.

1. *We must remove all obstructions to the contractor's progress.* The obstructions may come in the form of differing site conditions, design problems, delays in approving contractor submittals, contract modification funding problems, etc. NAVFAC is responsible for and may have to compensate the contractor for all delays other than those that are self-imposed by the contractor's organization or are excusable under the default clause of the contract. To avoid or minimize these delays, contract administrators should "run up a red flag" every time they occur and push their organization for a quick resolution. This must be a top priority item for everyone because neglect can be expensive.

2. *When delays or other problems for which the government is responsible do occur, we should document them when they happen.* Documentation should cover not only the period of time involved but also the extent of the work affected. We need to face the reality of the problem at the time and not sweep it under the rug, hoping it will go unnoticed. If a dispute is inevitable, contemporaneous records of a delay will be more accurate and carry more weight than allegations of its effects concocted many months later. When the facts indicate that a delay occurred, we must show a willingness to discuss its effects if we are to avoid a dispute.

3. *Everyone involved in the administration of our contracts must maintain an atmosphere of respect and objectivity, an atmosphere conducive to a good business relationship with our contractors.* Many disputes are rooted in an unharmonious relationship between contractor and government personnel. Again, we can't do it alone but we can at least maintain an air of cordial professionalism.

Disputes over differences in interpretation of the contract terms (i.e., ambiguities, omissions, conflicting requirements, etc.) occur frequently and will always exist. They are probably the easiest type of disputes to deal with because they can usually be reduced to a consideration of how several contract provisions relate to the disagreement.

Amicable disagreement is possible because the focus of the dispute is the language of the contract and not the conduct of one of the parties. Neither party needs to defend its actions.

Disputes over delay or acceleration costs, rejection of work, etc., on the other hand, are not as easy because the actions or the inactions of the parties are the focus of the dispute. Contract administrators may have success in avoiding disputes dealing with these issues by shifting the focus to the language of the contract rather than dwelling on subjective judgments of the actions or inactions of the government or the contractor. This approach will cause the disagreement to be treated objectively and will allow the parties to disagree with a minimum of defensiveness. The persuasiveness of the government's position will rest in the strength of its documentation.

Contract administrators must resolve all claims for which contractors have demonstrated reasonable entitlement at the field level. Invariably, the most realistic agreement can be reached at that level. □

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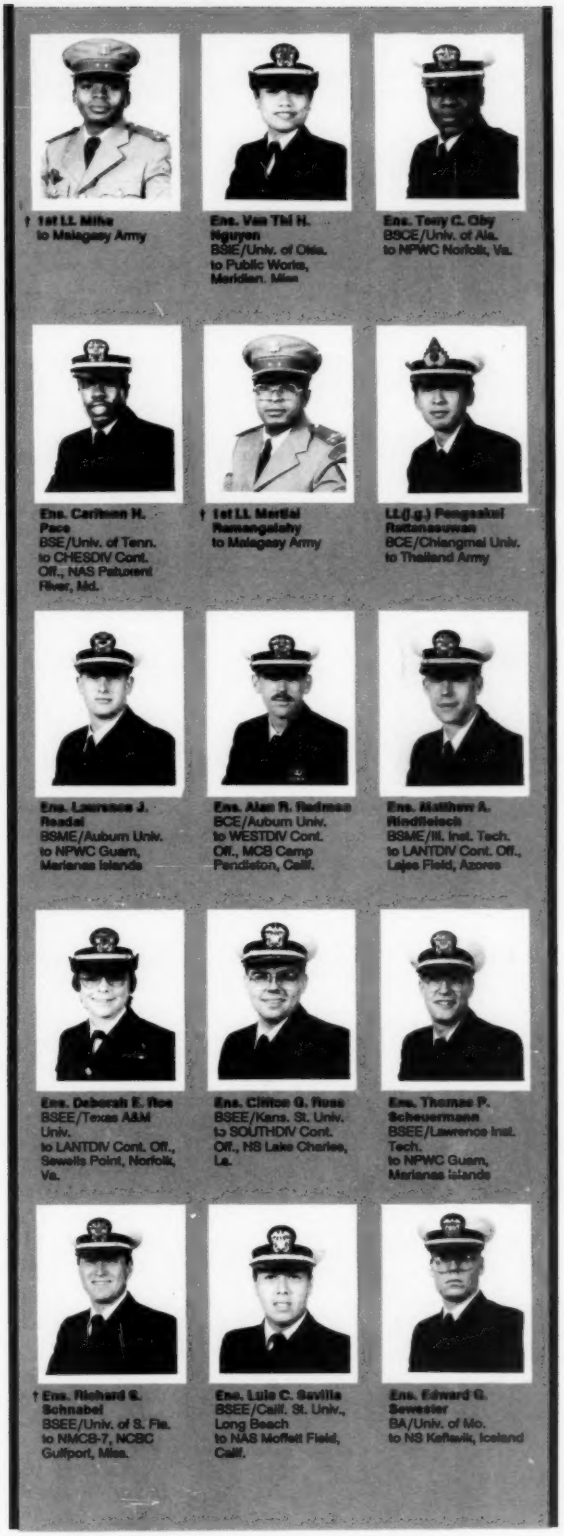
/s/ Anne-Marie O'Hara, Acting Editor



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Management survey results identify strengths and areas needing improvement within NAVFAC

By S. A. WRIGHT
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More than 150 Naval Facilities Engineering Command (NAVFAC) employees were surveyed to evaluate their attitudes about how they are managed. The data from the survey suggested certain strengths and some areas for improvement. The survey was based on the management principles outlined in the book, *In Search of Excellence*, by Peters and Waterman.

The survey was completed in 1987 as part of my Executive Management Development Program. Employees at NAVFAC's Atlantic Division, Western Division, and Public Works Centers Norfolk and San Diego were surveyed. Survey forms were sent to military and civilian employees selected at random from current organizational telephone directories. Each form had the same questions. In their book, Peters and Waterman identified eight common characteristics of financially successful companies like IBM, Delta Airlines, and MacDonald's restaurants. The survey form was designed to find out whether NAVFAC employees believed their particular organization had characteristics similar to these companies.

- One of the key strengths suggested by the survey is that NAVFAC employees are action oriented. They want to get on with the job at hand rather than spend too much time doing analysis and staff work. According to Peters and Waterman, too much time is spent by many organizations doing analysis as opposed to experimentation, which gets better results.

- The second important strength shown by the survey was that almost all employees were able to earn the respect of their peers, subordinates, and superiors. Peters and Waterman say that many managers in successful companies believe that respect for the individual employee is one of the most important positive characteristics of an organization.

- The third strength suggested was that most employees believed they were well qualified for their work assignments. This suggests that the functions of their organizations are relatively stable, with people able to gain and retain high levels of competency in their jobs.

The survey also identified a number of areas for improvement.

- One area suggested by the survey was to ensure that we are utilizing the principles of management by objectives. About half of those surveyed felt that these principles were not being followed--this limited their autonomy and flexibility to do the job effectively.

- Another area for improvement suggested, and one that the command is striving to improve, is the reduction of reporting requirements. About 40 percent of those surveyed felt there were too many reporting requirements.

- A third area suggested for improvement was customer relations. Although most employees felt that it was important to satisfy customer needs, only about half of those employees surveyed thought their customers contributed to the solution of problems. This could indicate that we don't listen to our customers as closely as we should. Peters and Waterman indicate that the successful companies were almost fanatical when it came to listening and learning from their customers.

- The final area of improvement was in the attitude of employees towards the NAVFAC mission. Most of use would say that NAVFAC's credo is to "support the fleet." About 40 percent of those surveyed did not have a positive attitude towards this credo or similar positive credos. We need to strive to ensure that all hands get behind a positive credo.

Thanks to everyone who participated in the survey! □

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